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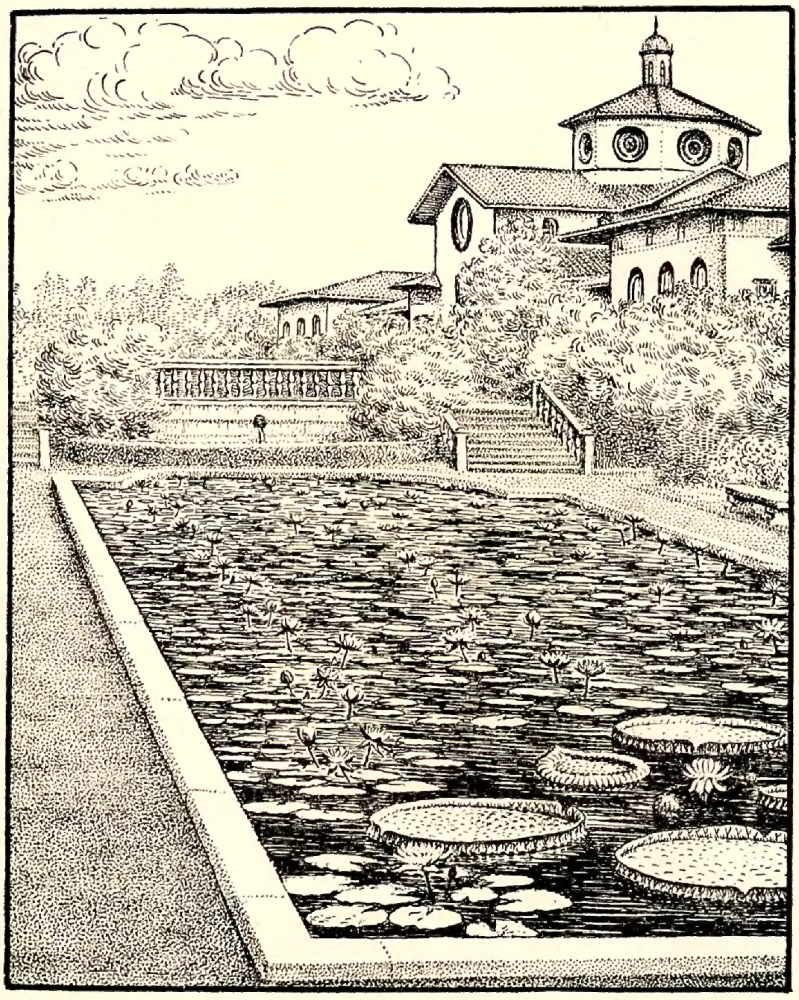
THIRTY-THIRD ANNUAL REPORT

OF THE

BROOKLYN BOTANIC GARDEN

1943



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THIRTY-THIRD ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN 1943

REPORT OF THE ACTING DIRECTOR [1]

TO THE BOTANIC GARDEN GOVERNING COMMITTEE:

I have the honor to present herewith the Thirty-third Annual Report.

The death of Dr. C. Stuart Gager on August 9, 1943, the Director of the Botanic Garden since its founding in 1910, was a very great loss to the institution. By his efforts for more than thirty-three years he shaped and guided its destinies and built up a Garden which has won world wide recognition for its research, contributions to botanical education, and the beauty of the grounds, combining a museum of living plants with special features such as the Children's Garden, Oriental Landscape Garden, Rose Garden, Rock Garden, Herb Garden, Medicinal Plant Garden, and Local Flora. His achievements are a monument to his vision of what a Botanic Garden should be.

The Victory Garden Movement.—The Botanic Garden has taken an active part in furthering the planting of Victory Gardens. Special courses of instruction were given in the spring and in the fall. In the spring a course on *Fundamentals of Gardening: The Flower Garden* (V8) by Miss Shaw, Miss Dorward, and Miss

[1] The illustration on the front cover page shows the Tropical Lily Pool and its situation with reference to the Laboratory Building. *Victoria regia*, in bloom, is shown in the foreground.

Clarke, had a registration of 28 students; a course on *Gardening for Food and Vitamins* (V10) by Mr. Free, a registration of 30; and two courses on *Gardening for Victory* (V11, V12), by Mr. Free and Miss Dorward, an enrollment of 53. One session was devoted to "*Information Please*," in which Mr. Free answered questions concerning gardening problems. There was a series of six guided tours through the conservatories on *Tropical Plants Important in the War Effort* (V22) by Dr. Graves, Dr. Gundersen, Miss Rusk, and Miss Ashwell; a series of four lectures on *Useful Plants* (V7) by Miss Dorward, Miss Rusk, Dr. Svenson, and Dr. Graves; a course of four lectures on *Gardening for Beauty* (V6) by Mr.H. R. Sebold, associate in Landscape Architecture, Columbia University, Mr. Doney, Miss Carroll, and Miss Clarke; and a course on *Spring Garden Work* (V9) by Miss Dorward.

In the fall a course on *Your Garden This Fall* (V1), and one on *House Plants* (V4) were given by Mr. Free. Mrs. H. K. Svenson gave one demonstration on *Jellies, Jams, and Preserves* (V13), assisted by Mrs. Martin Wifholm of Boston, an expert in home canning and preserving.

A series of three lectures on timely subjects was given on Mondays in March. Mrs. Esther Robertson Hallock, Instructor in Home Economics at Pratt Institute, Brooklyn, and at the Ballard School, Manhattan, gave a lecture-demonstration to an audience of about 150 on *The Preservation of Wartime Foods.*

Mrs. Stella Blanche Brevoort, formerly Instructor in Home Economics in New York University, gave a discussion on the history of weaving and making of textiles in a lecture *From Eve to Dupont.*

Miss Florence E. Wall, Consulting Chemist, New York City, and Lecturer in Cosmetology, New York University, outlined the history of cosmetics from ancient times in a lecture *Plants in Cosmetics—from Ancients to Moderns.* About 100 people attended.

Exhibits of material relating to each of these lectures were installed in the Rotunda.

Cooperation with the New York Victory Garden Council and C.D.V.O.—From March 15 to September 7 Dr. L. Gordon Utter gave his full time to the Victory Garden Council, devoting most

of it to garden activities in Brooklyn, in cooperating with the Garden Section of the C.D.V.O. under the direction of Mrs. John C. Parker. Dr. Utter visited various sections in Brooklyn, giving instruction and advice on the planting and care of the gardens. Considerable time was spent in the main office of the New York Victory Garden Council answering requests for information by telephone. Forty talks were given before various organizations on timely garden subjects, the total attendance at these being approximately 5,600.

In the Victory Garden course at Bloomingdale Bros. Inc. Miss Shaw and Miss Dorward gave two series of lectures.

Conservatory Exhibits.—A series of monthly exhibits was installed in the conservatories during the months of January, February, and March entitled *Plants Important in the War Program*, as follows:

January:	Rubber-yielding plants.
February:	Fiber, resin, cork, and gum plants.
March:	Beverage plants.

Demonstration Victory Gardens.—Two Victory Gardens were planted on the south end of the Esplanade, one 20 feet by 40 feet and the other 20 feet by 10 feet. In addition, a collection of vegetables was grown. In the Experimental Field 30 plots averaging about 450 square feet each were assigned to employees, who tended them after Garden hours and produced good crops of vegetables. On September 23 and 24 a Victory Garden Harvest Show of produce from the victory gardens, children's gardens, and employees' gardens was held in the rotunda of the Laboratory Building. Prizes of war stamps were awarded to Natalie Bowen, Alys Sutcliffe, Henry Funk and Anton Hubert.

Motion Pictures of Victory Gardening.—A showing of sound films on Victory Gardening, released by the British Information Services, was given on April 20 in the auditorium of the Laboratory Building, the films illustrating the following topics: 1. Dig for victory; 2. How to dig; 3. Sowing and planting; 4. Storing vegetables indoors. The attendance was about 500.

Annual Spring Inspection and Flower Days.—The Twenty-ninth Annual Spring Inspection of the Garden was held on May

11 and was attended by 450. The tour of the grounds included the Culinary Herb Garden, Cherry Walk, the Model Victory Gardens and the large planting of Poet's narcissus.

The exhibit in the building stressed the scientific basis of hybrid corn production, as well as the improvement in varieties of vegetables. Dr. George H. Shull, Professor Emeritus of Princeton University, who laid the scientific foundation for hybrid corn production in 1905–1909, honored us by his presence and courteously answered questions asked by those interested. It may be noted that it was approximately twenty years later before the practical application of the scientific data was made on a large scale. This is a fine illustration of the time lapse which may occur with important scientific discoveries and their final utilization in every-day life.

Three Flower Days were observed. On Tuesday, June 22, the Sixteenth Annual Rose Garden Day was attended by about 100 members and guests. Mr. F. F. Rockwell, Garden Editor of the *New York Times*, spoke on *Roses*. The tour of inspection of the Rose Garden was conducted by Mr. Free and Mr. Tilley.

On Tuesday, October 5, Fall Rose Garden Day was held, Mr. S. R. Tilley speaking on *Putting the Roses to Bed.* About 50 persons were present at the lecture and inspection of the Garden.

On Friday, November 5, Chrysanthemum Day was observed. For the benefit of those who attended there was a preview of a special display of greenhouse-grown chrysanthemums, which was opened to the public on the following day. Members of 12 Brooklyn garden clubs received special invitations to participate and to meet the Botanic Garden staff. About 150 persons were present and listened to a talk on the *Story of the Chrysanthemum* by Mr. Montague Free. Miss Hilda Loines, Chairman of the Governing Board, presided.

The social part of the Spring Inspection and Flower Days was in charge of the entertainment committee of the Woman's Auxiliary of the Garden, Mrs. Edwin H. Thatcher, Chairman, and we are pleased to have the opportunity of acknowledging our indebtedness to this organization.

War Bond Rally.—A rally to enlist volunteers to aid in the Third War Loan Drive was held in the auditorium of the Labora-

tory Building on August 31. This meeting was conducted by the Women's Division of the Kings County Welfare Committee of the War Savings Staff of the U. S. Treasury Department. The meeting was arranged for by Mrs. Thomas Sturgis, and was attended by over 400 people.

Sale of Defense Stamps and Bonds in the Garden.—The Kings County War Savings Staff, as in 1942, sold Defense Stamps and Bonds in the Garden on Sundays throughout the summer, beginning on May 23 and ending on October 2. The sales totaled $958.65. Mrs. J. Shapiro, Chairman of Booths, Women's Division, was in charge.

Woman's Auxiliary.—The Auxiliary gave to the Garden the sum of $500.00, $300.00 of which was applied to the new planting of 76 flowering cherry trees on the Esplanade.

Cooperation with Other Institutions.—In the reports on Research, mention is made of cooperation with other institutions, including the Division of Cereal Crops and Diseases and the Division of Forest Pathology of the United States Department of Agriculture. In the report of the Curator of the Herbarium the reciprocal loans of specimens for study are noted. From the Mycological collection two type specimens were loaned to Dr. Anna E. Jenkins, Division of Mycology and Disease Survey, Bureau of Plant Industry Station, Beltsville, Md., and specimens of Porto Rican fungi to Prof. H. H. Whetzel, Department of Plant Pathology, Cornell University.

The Garden is building up its collection of flowering crab apples and ornamental cherries. With this in view, cions have been obtained from the Arnold Arboretum, Mr. Richard E. Horsey of Highland Park, Rochester, N. Y., Mr. B. Y. Morrison, Bureau of Plant Industry Station, Beltsville, Md., N. Y. State Institute of Agriculture, Farmingdale, N. Y., and Mr. John C. Wister of the Arthur Hoyt Scott Horticultural Foundation, Swarthmore, Pa.

In connection with iris hybridization studies, Prof. A. F. Blakeslee, Smith College, Northampton, Mass., gave active cooperation.

Contributions of Plants.—About 100 surplus conservatory plants were supplied for a greenhouse in the Brooklyn Navy Yard. Eighty-two trees and shrubs were given to beautify the

grounds of the Halloran General Hospital, Staten Island. Nine trees, 4 vines and about 100 perennials were sent to the Navy Hospital on Staten Island. Flowers were provided for the recreation hall of the U. S. Coast Guard. A demonstration of tree pruning for the purpose of providing practice in motion picture photography was given to members of the Signal Corps, U. S. Army. A considerable number of shrubs and trees and bearded iris was given to Queens College.

Plant material was supplied to the Brooklyn Museum for a Chinese exhibit, and to the United China Relief, Inc., for the Chinese Pavilion at the Women's International Exposition at Madison Square Garden. A model "Doll's Garden" was prepared for the Anniversary Celebration of the Children's Museum.

Seed Packets for School Children.—Over a million and a quarter packets of seed were distributed: a great help to children's home Victory Gardens.

Volunteer Workers.—The various activities of the Garden have been greatly aided by the voluntary services of a number of individuals. In the Department of Elementary Instruction the following rendered assistance: Mrs. B. Baigel; Mrs. I. O. Becher; Mrs. G. Bernstein; Miss Bertha Blau; Miss Elma Edson; Mrs. Benjamin Davidson; Mrs. George Gordon; Miss Ellen Gundersen; Mrs. Oscar Kaye; Miss Ethel Hallaren; Miss Helen Mattin; Mrs. H. Nalib; Mrs. M. Oren; Mr. Harold Quoyoon; Miss Cora Reed; Mrs. Harry Schiff; Miss Charlotte Slawson; Miss Agnes M. Shaw; Mrs. N. T. Steeves; Mrs. I. Waldes; Mrs. E. H. Weissberger. During the summer five elementary school teachers each gave a week's service, authorized by the Board of Education.

In the Department of Pathology, Mrs. M. Oren assisted in the field and laboratory work. Miss Zina Kiziuta, a student of Cornell University, spent the month of June attempting a large number of crosses between different iris species.

In connection with the American Fern Society herbarium, Mrs. Herbert Lawrence again assisted.

Mr. John Coates (assigned to the Department of Elementary Instruction) worked 84 days as a volunteer gardener.

Publication.—Two illustrated Guides to the Garden collections have been published:

Guide No. 15. The Herb Garden of the Brooklyn Botanic Garden, published in the January number of the *Record*. In Part 1 Miss Elizabeth Remsen Van Brunt, Honorary Curator of Culinary Herbs, describes *Culinary Herbs: Their Culture, Traditions, and Use*. In Part 2 Mrs. Virginia Riddle Svenson, of the Department of Home Economics of New York University, in *Cooking with Herbs*, gives recipes for using forty-five of the culinary herbs growing in the Brooklyn Botanic Garden.

Guide No. 16. The Medicinal Plant Garden of the Brooklyn Botanic Garden was published in the July number of the *Record*. There is a *Foreword* by Dr. C. Stuart Gager, *A Brief Historical Survey of the Use of Plants in Medicine* by Dr. Arthur Harmount Graves, *Medicinal Uses of Drug Plants Cultivated in the Medicinal Plant Garden of the Brooklyn Botanic Garden* by Professor C. W. Ballard, Dean, College of Pharmacy, Columbia University, with the collaboration of Dr. Ralph H. Cheney, Resident Investigator, Brooklyn Botanic Garden, Chairman, Biology Department, Long Island University, and Prof. F. J. Pokorny, College of Pharmacy, Columbia University, and Mr. William E. Jordan, Librarian, gives *A Short List of the Books in the Library of the Brooklyn Botanic Garden Dealing with the Early Use of Plants in Medicine.*

The Library.—The Librarian reports that 153 volumes were purchased, gifts during the year including 81 volumes, 372 pamphlets, and 936 parts. Of periodicals and other serials, 488 were received as exchanges, 90 as gifts, 99 as purchases, and 5 through publication. Loans to other institutions totaled 32 items.

Herbarium.—There were added to the Phanerogamic Herbarium 1112 specimens by exchange, 875 by gift, 8 by collection, and 301 by purchase. One fern specimen was received as a gift. 2,105 specimens were added to the Mycological Herbarium.

Personnel.—*Mr. Andrew J. Gonnoud* and *Mr. Donald G. C. Sinclair* were elected as new members of the Botanic Garden Governing Committee at the meeting of the Trustees of the Brooklyn Institute of Arts and Sciences on April 9.

Dr. George M. Reed became Acting Director of the Botanic Garden as of September 24.

Miss G. Elizabeth Ashwell resigned as Curatorial Assistant in the Department of Public Instruction as of July 31.

Miss Virginia A. Clay, previously stenographer in the Director's office, was transferred to the Department of Public Instruction as of November 15.

Miss Jeanne Phyllis Walther, Research Assistant in Plant Pathology, resigned as of April 30.

Attendance.—Due to war time restrictions, the attendance of visiting classes was greatly reduced during the spring months. In the fall, however, there was a return of classes for instruction. The accompanying table records the general attendance of classes during the year.

ATTENDANCE AT THE GARDEN DURING 1943

	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes.	802	1,504	3,419	3,448	3,325	4,792	17,500
At visiting classes.	162	30	779	2,785	10,864	3,959	48
At lectures to children.....	88	20	579	1,594	3,330	938	14
At lectures to adults.....	50	39	458	242	393	58	25
At conservatories.	6,033	8,128	9,495	24,038	28,921	10,094	9,908
At grounds.....	65,254	88,383	87,665	177,712	258,358	155,114	133,398

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes.....	19,250	2,569	2,137	2,374	1,493	62,613
At visiting classes.....	316	81	820	2,582	411	22,837
At lectures to children..	42	0	620	1,464	188	8,877
At lectures to adults....	0	0	108	129	843	2,345
At conservatories.....	10,513	13,633	9,463	15,371	6,981	152,578
At grounds.....	126,598	131,095	96,945	100,325	44,943	1,465,790

For 1942 the figures for total attendance were 1,660,046, while for 1943 they were 1,465,790.

Attendance in both visiting classes and regular classes showed an increase of 17,549 and 8,357 persons respectively.

Financial.—A list of the gifts of funds, publications, plants, and other objects may be found on pages 33–38. These have all been acknowledged as received.

The total operating budget for the calendar year 1943 was as follows, with comparison for 1942:

	1943	*1942*	*Change*
Tax Budget (47.20%)	$ 96,324.66	$ 91,830.67	+$ 4,493.99
Private Funds (52.80%)	107,581.85	94,099.09	+ 13,482.76
Totals	$203,906.51	$185,929.76	+$17,976.75

The Tax Budget shows an increase of $4,493.99. This is due largely to the increase in salaries and wages of employees in the salary range $1,200 to $2,500.

The Private Funds Budget shows an increase of $13,482.76. This is due largely to extra income from interest received on investments.

Improvement in Salaries and Wages.—In consideration of the rising cost of living, the sum of $3,720.00 was appropriated by the City of New York on July 1, 1943, to provide for an increase of $120.00 a year for employees in the salary range of $1,200.00–$1,800.00 and an increase of $180.00 a year for employees in the salary range of $1,800.00–$2,500.00. Also the wages of the per diem men were increased by $.50 per day, which made a total increase in wages of $2,496.00

The above increases for both salaries and wages were approved for the year 1943–1944 only.

This Annual Report is briefer than those published in recent years but we believe that it includes an adequate summary of the Garden's activities for 1943.

It is planned to devote the April number of the *Record* as a special memorial to Dr. Gager.

Respectfully submitted,

GEORGE M. REED,
Acting Director.

REPORTS ON RESEARCH FOR 1943

PLANT PATHOLOGY

BY GEORGE M. REED

Physiologic Races of the Oat Smuts.—The problem of developing new resistant varieties of useful plants is complicated by the

existence of physiologic races of the pathogens. In recent years the Victoria oat variety, introduced from South America, has been used extensively in oat-breeding work and has proved particularly valuable because of its high degree of resistance to known races of both loose and covered smuts. Victoria has been crossed with other varieties and, from the hybrids, selections have been made, some of which are well adapted to the Northern oat-growing region, while others are suitable as winter oats in the South. However, new races of smut have been discovered which attack Victoria and many of the most desirable selections derived from the crosses in which it was one of the parents. In most of these cases both of the original varieties used in crossing were susceptible to the new races. In some cases, however, resistant selections have been obtained from hybrids in which Victoria has been crossed with a variety resistant to the new races, and among the latter are some of the outstanding recently introduced varieties of oats for the North, such as Vicland in Wisconsin and adjacent States.

Investigations on the resistance of newly developed varieties of oats and the discovery of new races of oat smuts have resulted from cooperation with Mr. T. R. Stanton, Senior Agronomist, Division of Cereal Crops and Diseases, Bureau of Plant Industry, Beltsville, Md., and Dr. George J. Wilds, Coker's Pedigreed Seed Co., Hartsville, S. C.

Studies on the Inheritance of Oat Smut Resistance.—As reported last year, experiments were conducted with second generation plants of hybrids involving Victoria and Monarch, inoculated with Race 1 of the covered smut, to which Victoria is resistant and Monarch is susceptible, the data secured indicating a single factor for resistance. During the past year 200 third generation progenies were grown and the data obtained confirm the conclusion that one resistant factor differentiates the two parental varieties.

The second generation plants of 32 additional crosses were tested with definite physiologic races of smut. The parental varieties of these hybrids varied in their reaction to the races used. In some cases the data indicate a single factor difference while in others two or more factors seem to be involved.

The first generation plants of 32 later crosses were grown. The original hybridizing had been done by Miss Jeanne P. Walther in 1942. The parental varieties used in these crosses differed in their reaction to known physiologic races, and the data on the behavior of the second generation of the hybrids will be obtained during the coming year.

Chestnut Breeding Work in 1943

By Arthur Harmount Graves

This project has been fully explained in previous reports, but for those who are unacquainted with it I might say briefly that by breeding and selection we are endeavoring to develop a new chestnut stock which shall be of tall timber type and at the same time immune (or as nearly so as can be) to the dread blight which has killed off practically all chestnut in its natural range in the eastern U. S.

Breeding Work in 1943.—Since the report of this year's work must be brief, I shall say only that the crossing of our hybrids with each other and back crossing of them with resistant Japanese and Chinese individuals has gone on as usual. In early October we gathered 365 nuts, presumably all of hybrid nature, from these crosses. Most of these have been planted in pots in cold frames at the Hamden plantation, but a few are in the Garden cold frames.

Inarching of Basal Shoots of Hybrids.—We have continued the practice, explained in my report for 1941, of keeping our F1 hybrids in a vigorous condition by inarching the basal shoots, thus bridging over lesions caused by the blight fungus. Nearly all of the grafts of this sort made this spring were successful, so that we have on hand a good supply of fine breeding stock.

Hybrids of 1942.—This year the young trees resulting from the hybrid nuts of 1942 were set out according to pedigree in a special nursery: that is, the trees resulting from each particular cross (called, technically, "sibs") were planted in sequence in the rows in order that their behavior might be compared. Of these seedlings I selected at the end of the season, in mid-September, about 50 trees which had attained a growth of 2 feet or more,

and the remainder, about 225, were shipped to the Division of Forest Pathology at Beltsville, Maryland, where they are to be set out in a good location. The 50 trees that I have kept will be tested for disease resistance by the inoculation method, and the most resistant will be used for further breeding.

American Seedlings.—About 300 one- and two-year-old seedlings of American chestnut were set out in another nursery. These were grown from nuts received from various places in the Eastern States (see reports for 1941 and 1942). This winter these seedlings were covered with brush, an apparently effective way of preventing rabbits from shearing them off. The hybrid seedlings of 1942 were protected from rabbits by a fence of wire netting, and from pine mice by a border of wire netting sunk one foot deep in the ground.

Inoculations for Testing Disease Resistance.—In cooperation with the Division of Forest Pathology, U.S.D.A., we started during the summer another series of inoculations—about 250 in all, to test the disease resistance of our hybrids. A detailed report of this work must be postponed for the present.

Studies of Disease Resistance.—The ultimate cause of blight resistance in some species and individuals and of susceptibility in others has never been determined. It appears quite likely that it is related to the relative degrees of sap concentrations in the cells of the host and parasite. This hypothesis is not new, but was put forward by Dr. A. P. Kelley, of Landenberg, Penna., in *Science* for March 22, 1940. With the cordial cooperation of Dr. E. W. Sinnott and the staff members of the Osborne Botanical Laboratory at Yale University I spent some time at the laboratory during the summer in studying this problem. The work will be continued in 1944.

Cooperative Plantations.—The plantation of Chinese and Chinese hybrids at Litchfield on land of the White Memorial Foundation was visited several times during the summer, and now, thanks to the interest and cooperation of Mr. Clifford Ongley, superintendent, the plantation is in a thrifty condition. Our chief enemy has been the deer, but the details of the situation will be presented in a later report.—In the plantation of hybrids on land of Mr. Archer M. Huntington at Redding Ridge, Conn., which

has been started through the cooperation of Dr. D. F. Jones, Geneticist of the Conn. Agricultural Experiment Station, New Haven. Conn., there have been some fatalities due to the cold winter of 1942–3, but when these trees get established in their new locations they should contribute in many ways to the success of our project.—At the plantation of Dr. W. W. Herrick, of Sharon, Conn., a considerable number had died also from the effects of the cold winter.

Acknowledgments.—Pollen of the American chestnut was received from Mr. E. J. Grassmann of Elizabeth, N. J., on July 3; and from Mr. John A. Colin, New York City, from Millhurst, N. J.

We received in February, 6 trees of *Castanea mollissima*, variety Hobson, from Mr. James Hobson of Jasper, Florida; in March and April, 2 lots of *C. alnifolia* seedlings from Mr. Joseph C. MacDaniel, Monticello, Florida.

Nuts for planting were received as follows:

September. American chestnut from Mrs. Arthur Manzo, New York City, from Old Lyme, Conn.; Japanese chestnut from Mr. Oscar R. Wallace, New York City, from Sunken Meadow Park, Kings Park, L. I.

October. *Castanea pumila* x *C. crenata*, hybrids of American chinquapin and Japanese chestnut, from Dr. A. S. Hitchcock, Boyce Thompson Institute, Yonkers, N. Y.; American chestnut from Mr. F. Gregg Bemis, Boston, Mass., Mr. L. Wolcott, Kennett Square, Pa., and Mr. H. D. Roschen, Baltimore, Md.

November. American chestnuts from Mrs. F. M. Islieb, East Hampton, Conn.; Mr. W. F. Story, Dunlap, Tenn.; and Mr. C. Howard, Hancock, N. Y.

As in former years, we have enjoyed the cordial cooperation of the Division of Forest Pathology of the United States Department of Agriculture. To the many correspondents, visitors, and donors of nuts, pollen, seedlings and land for carrying on our experiments, we are pleased to have this opportunity of acknowledging our indebtedness for these substantial evidences of their interest in this undertaking.

Flower Structure and the Classification of Dicotyledons

By Alfred Gundersen

During the year studies were made in a number of families including Hamamelidaceae, Magnoliaceae and Caryophyllaceae. Miss Maud H. Purdy added details to a number of earlier drawings.

In July through the favor of Dr. John T. Howell of the California Academy of Sciences we obtained a fresh plant of *Frankenia grandiflora*, of which we had had only dried material. A color study was completed and details of development show many resemblances with the Caryophyllaceae. In particular the bud stage of Caryophyllaceae suggests the adult stage of Frankenia.

About sixty of Miss Purdy's drawings, and some from published figures were combined into two charts to illustrate flower structures in seventy families; these were printed in the September *Bulletin of the Torrey Botanical Club*. In the accompanying article a tentative arrangement of Dicotyledons, in part intermediate between the classic system of Engler and that of Bentham and Hooker is proposed. The nine groups adopted are represented by the genera Magnolia, Betula, Cistus, Malva, Geranium, Myrtus, Dianthus, Fraxinus and Rubia.

Herbarium Research and Field Work

By Henry K. Svenson

During the past year the extensive annotated catalogue of plants collected by me in Western Ecuador and Peru has been finished. A report, together with photographs of the region, description of floral areas, and line drawings by Miss Purdy, is ready for publication. The area varies from desert to tropical rain forest often within the distance of a few miles, and therefore represents one of the most remarkable climatic transitions to be found in the world. The cause seems to lie in the drying southerly winds which blow off the cold Humboldt Current during the greater part of the year, and the precipitation of fogs on adjacent mountains lying almost directly on the equator. The region is covered mostly by thorn-bush and grasslands, strikingly similar in appearance to the thorn-bush plains of East Africa.

In collaboration with the Missouri Botanical Garden I completed an extensive account of the Cyperaceae of Panama, published in September, and during the year determined North American and South American Cyperaceae for a number of institutions. I have nearly completed the Cyperaceae for the North American Flora in collaboration with the New York Botanical Garden. Due to travel difficulties no field work has been carried on during the past year.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1943

To the Acting Director:

Grounds.—The total attendance on the grounds was 1,465,790, less than last year by 194,256. This drop is not surprising, considering the stringency in transportation facilities and the general changed conditions due to war activities. In his report of last year (*B.B.G. Record* **32**: 45) Dr. Gager showed that other public and semi-public institutions of N. Y. City have reported a decrease in attendance—some of these to a much greater extent than at the Brooklyn Botanic Garden.

For one month only the attendance exceeded all past records, namely, February, with an attendance of 88,383. The nearest previous figure was in 1939—86,925. The reason for this record attendance was evidently the unusual warm weather of the Washington's Birthday week-end—the three day period including Monday, February 22. For this week-end the attendance was 37,683, not far from half of the whole February attendance. The thermometer hovered around 60°, and this and the blooming of the snowdrops and oriental witch hazels were the principal reasons for the throngs of visitors.

Conservatories.—The yearly attendance at the conservatories —152,578—was much greater than for many years—in fact only once (in 1935, 154,659) has it been exceeded. The exhibits of rubber-yielding, beverage, and fiber plants early in the year, the magnificent display of Chrysanthemums in November, and the blooming of more than 200 Poinsettias in December, as well as the generally improved arrangement of plants in all the ranges, no doubt account for a large part of the increase.

Classes and Lectures.—The combined attendance at classes and lectures for children and adults at the Garden was 96,672, a considerable increase over that of last year.

Adult Courses and Lectures.—The total registration of adults in our courses for 1943 was 969, a somewhat lower figure than for several years past, due to several causes, but fundamentally, of course, to changes brought about by war conditions. A large factor was the drop in registration of student nurses, who have been coming by the hundreds in past years. The course for nurses, which has now been given for 16 years, has never been a part of the curriculum required by the State; and so, with the ever increasing demand for trained nurses and, therewith, the necessity for cutting down the training time to as short a period as possible, everything not absolutely essential is being omitted. Nevertheless, St. Johns Hospital sent us their class of 37 young women for 5 weeks in the fall (10 weeks is the usual length of the course), and the Staten Island, and the Methodist and Norwegian hospitals in Brooklyn sent us their students for at least one trip through the garden to see the important medicinal plants. But when the groups come only once or twice, according to our custom they are classified under the heading of visiting classes, and not as registered students.

Courses Given by This Department.—The Conservatory course entitled "Plants of Tropical America" was fairly well attended, 24 people registering. This course consisted of 6 weekly tours through the conservatories Wednesdays at 3 p.m. to see the important economic plants. Informal talks were given by Dr. Gundersen, Miss Rusk, Miss Ashwell, and myself. In my course on Trees and Shrubs, 19 people registered in the spring and 20 in the fall. In the new course—"Trees in the Botanic Garden"—which Dr. Gundersen and I offered, 6 people registered. For the course A44, "Gardens within a Garden," 52 people registered. This consists of weekly tours through the garden to see various floral displays and to get acquainted with the general plan of the Garden. As of last year, this course was one of those on the calendar of the Department of Education of the Brooklyn Institute in cooperation with the Botanic Garden. Miss Rusk gave 4 courses on native ferns and wild flowers, three of them out-of-door courses and 1 combining laboratory and field work. She

assisted me in the course in the fall given to the class of 37 student nurses from St. Johns Hospital.

Publicity.—Seventy-one pages of news items about the Garden were mailed at weekly or biweekly intervals through the year to principal metropolitan newspapers and to various periodicals, especially those dealing with gardening or the home. As usual, members of our staff have given radio talks over WNYC, the municipal station, from January to June and from October to December inclusive. This year these talks came on alternate Fridays at 3:30 p.m. Programs of these talks were prepared, printed and issued to members and friends of the Garden. Courses about to start at the Garden have been described in these broadcasts and the public invited to attend. Circulars of our winter, spring, and fall courses were mailed to members and to former students in our classes. The annual *Prospectus* of Courses was issued in early September. Postcard bulletins were mimeographed and mailed to members of the Garden as follows: January 15, announcing the special conservatory exhibits of rubber, beverage, fiber plants, etc.; March 8, telling of seed catalogs available for consultation in the Library; April 12, inviting members to a showing of sound films on Victory Gardening; September 13, telling of the Harvest Show in the Rotunda; and November 5, announcing the special display of Chrysanthemums in the Conservatories. From January to April, inclusive, and in November and December, I have prepared or written articles on the Botanic Garden for the Brooklyn Institute *Bulletin*. I have announced the events at the Garden through the year, by means of the four bulletin boards on the grounds, and in the IRT Eastern Parkway-Brooklyn Museum station. Placard advertisements of the Garden, telling of its principal features and attractions, have been placed in Brooklyn trolley cars, and arrangements for inserting similar cards in the New York subways are now under way.

Personnel.—Miss Rusk has continued to serve as Librarian and Curator of the Herbarium of the American Fern Society. Besides her teaching of classes, mentioned above, she has assisted in docentry, prepared monthly, quarterly, and annual reports, compiled the copy for the annual *Prospectus* of Courses, and assisted us in various other ways. As in former years, she had the voluntary assistance of Mrs. Herbert Lawrence, a member

of the Garden, for two half-days each week during the first half of the year. In the summer Miss Rusk assisted me at the experimental chestnut plantations at Hamden, Connecticut.

I have continued to serve as counselor for the Brooklyn Branch of the Boy Scouts of America, examining candidates for merit or for eagle badges; as editor of the plant section of General Biology for *Biological Abstracts;* editor of the Brooklyn Botanic Garden *Leaflets* and of the *Contributions;* an associate editor of the *Bulletin of the Torrey Botanical Club;* a Director of the School Nature League of Manhattan; councillor for the Torrey Botanical Club; member of the Museums Council of New York City; and Collaborator of the Division of Forest Pathology of the Bureau of Plant Industry, United States Department of Agriculture. With the exception of ten days' vacation in August, I spent the summer, from June 15 to September 15, in research work at our chestnut plantation at Hamden, Connecticut.

Bureau of Information.—As usual, a considerable amount of time has been consumed in answering requests for information by telephone, by letter, and in person.

Woods Sent to Yale.—During the year, wood samples of the following species were sent to the Yale School of Forestry to enrich their collection; and, at the same time, specimens were added to our own collections: *Koelreuteria paniculata; Cedrela sinensis; Hippophae rhamnoides;* Rose, Dr. Van Fleet; *Rhus trilobata; Picrodendron; Benzoin aestivale.*

Alumni Reunion.—On Saturday afternoon, March 6, Mr. Rutherford Platt of the Platt-Forbes Company of New York City, again showed selections from his series of unique kodachrome slides to an enthusiastic audience composed of alumni of our out-of-door classes. The affair was called "Indoor winter field trip for 'friends of plants' (philophytes)." The Garden is indebted to Mr. Platt for his excellent and interesting presentation of his subject and for this evidence of his continued interest in its work.

Abraham Lincoln High School Field Day.—On Saturday morning, May 15, 90 pupils of the Abraham Lincoln High School biology department observed their annual Brooklyn Botanic Garden field day. Outlines of the various features of the Garden, prepared and mimeographed by this department, were distributed

to them. They were docented in the Wild Flower Garden by Miss Rusk, and Miss Clarke explained the demonstration victory gardens. Their visit concluded with a talk on Victory Gardening, illustrated by lantern slides, by Miss Clarke in the auditorium.

Respectfully submitted,

ARTHUR HARMOUNT GRAVES,
Curator of Public Instruction.

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION FOR 1943

TO THE ACTING DIRECTOR:

The war has caused drastic changes in our Department's work.

A. Teachers' Classes.—Classes have changed entirely. No one of our regular classes was dropped. In fact, new classes have been added by request of the Board of Education and by individual groups of teachers. The Department has also done its part in the Victory Garden program set up for the general public.

B. Distribution of Material.—This year there was renewed interest in this phase of our work. Service was extended to over 4,000 teachers and the materials were used in classes represented by 187,000 children.

C. Children's Saturday Morning Classes.—These remained the same in numbers, but during the summer older boys and girls left to help on farms and in other phases of war work. This threw greater responsibility upon the children, which, in a way was no hardship. Their gardens were planned as "War Gardens" and much home canning was done.

D. Visiting Classes.—The spring list of talks offered to the schools was short, cut down to cover only subjects relating to the war, such as "Plants bottle-necked by the war—rubber, fiber, and beverage plants," "Victory Gardens," etc. The classes did not come in large groups but in small ones, due to recommendations made by the Board of Education. No list of lectures was was sent out in the fall because of much seed work to do. Still classes came!

E. Seed Work.—The same landslide which general seed houses encountered in the spring was ours too. It was quite impossible to fill all the orders sent to us from the schools. Our penny

packets of seed are used in children's home gardens. In March the vegetable packets gave out and much time had to be spent in filling more—a great handicap to the work. Another set-back due to the war came through the printing company. Because of the priority of government orders, we were unable to have our seed envelopes until late August. Nearly half the filling of packets is usually done by children during the summer as part of their contribution to the Garden and for advancement for their honors. Since this papering of seed must be done, the Department has put in days and hours on this mechanical job, which, if not covered, would embarrass the Department's financial budget. It is a serious matter for a department of education to be obliged to set aside an important part of a program which is essential. A better adjustment of work should be made so that those appointed to educational positions should not be obliged to spend undue time on mechanical work.

The following figures show something of the work accomplished during 1943 in spite of the handicaps mentioned.

Study Material was supplied to 150 institutions as a result of 224 requests.

Plants raised in our Brooklyn Botanic Garden classes numbered nearly 25,000. This figure represents the work of nearly 900 students—children and adults. Besides these, all plants raised in all other Victory Garden courses are handled in the Department's instruction greenhouses.

Plants distributed to school gardens numbered somewhat over 1,000. These were given to help the Victory Garden movement.

Crops from the Children's Garden amounted in market price to about $1,600 this year. Our bumper crops were represented by nearly two tons of tomatoes, over 8,000 beets, nearly 800 pounds of beans and chard, and over 200 pounds of New Zealand spinach. Only marketable crops are included in these numbers.

Other Activities.—Potted plants were given to the Brooklyn Naval Hospital at Easter, and a part of the Children's Garden was planted with annuals which supplied a weekly box of flowers to the Hospital from July until October. Potted plants were also given to be sold at a Carnival to raise money for the maintenance of the Music Box Canteen for Merchant Marine, Soldiers, and Sailors, and to the Brooklyn High School for Homemaking

for a Red Cross benefit. Five dozen plants were given at Christmastime to Hospitalized Service Men.

The Department assisted in two series of Victory Garden lectures given at Bloomingdale's.

A special course was given to teachers from the Brooklyn High School for Specialty Trades at the request of their Principal.

The Assistant Curator worked with the Harmon Foundation on a garden film which has not been completed.

It might be pertinent to mention here that the extra Victory Garden courses given to teachers include practice for every single teacher in spading, raking, hoeing, making of drills and hills, and planting of seed.

The fourth in our series of booklets, "Our Boys and Girls Club," has been printed.

The Boys and Girls Club still supports as a war project the Christmas treat for boys and girls of our village—Northbourne, England. £18 sterling and two boxes of clothing were sent to the Village this year.

The sum of $50 was given by the Goodman Family to remake the rose garden in the Children's Garden area and to buy new roses. This is a memorial garden to Bernard Goodman, once a member of the Boys and Girls Club.

Miss Sadie Hecht's gift of four war bonds for the Ellen Eddy Shaw Endowment Fund should also be noted.

Respectfully submitted,

ELLEN EDDY SHAW,
Curator of Elementary Instruction.

REPORT OF THE CURATOR OF PLANTS FOR 1943

TO THE ACTING DIRECTOR:

In the list of trees of the Garden printed two years ago were included a number of small doubtfully hardy trees in the nursery, most of these have not survived the past two winters. We have had many trees, for example *Sequoia* and *Abies concolor*, living to ten years or so, then loosing them in an unfavorable season. If we could, by special care or soil conditions, bring them to a larger

size they might have a chance of becoming established. Red Pine and Western Yellow Pine thrive a short distance Northward, but we have had no success with these. In spite of city conditions a few of our conifers such as the Atlas Cedars, Himalayan Pine, Cryptomeria and others are outstanding trees in our Garden.

Mr. C. F. Doney reports that a few new species and varieties were added to our collections, among them *Quercus Libani*, and *Gleditsia sinensis*. On the border mound some old plantings of common material, as Rhodotypus and Privet, were replaced with groups of such uncommon plants as Orixa, Cudrania and Staphylea hybrids. A collection of young hybrid Azaleas from the U.S.D.A. was planted near the south end of the Garden. With the practical discontinuation of the International Seed Exchange the number of plants in our nursery is sharply reduced.

Gradually our lilac collection is being arranged by groups, with those not of the first rank separated.

A list of plants in the new Desert Plant House was made by Mr. Doney and Miss Clarke. In the fall Miss Clarke assisted in the naming of our palm collection, about thirty species.

Our collection of specimens of cultivated plants has been further improved and expanded. A collection of specimens of Herb Garden plants was made.

With Dr. Graves I gave a spring course on Trees in the Garden, Mr. Doney gave his usual courses on Ornamental Shrubs.

Signs and labels were made by Mr. John McCallum as follows:

Small galvanized labels for herbaceous beds and Rose Garden	18
Lead labels for woody plants	15
Small wood labels for Roses, Iris etc.	363
Large wood labels	31
Wooden signs	25
Cardboard signs	50
Twelve inch wood labels for special planting	70
Wooden hanging labels for woody plants	96
Total	668

Also numerous miscellaneous numbers and signs.

Respectfully submitted,

ALFRED GUNDERSEN,
Curator of Plants.

REPORT OF THE CURATOR OF THE HERBARIUM FOR 1943

To the Acting Director:

The Local Flora Section.—With the accession of the limestone ledge described in last year's *Record* the plant habitats of the Local Flora Section have all been established. Much still remains to be done in improving soil conditions, especially in the vicinity of the new limestone development, and such improvements will be followed by introduction of many native plants not yet represented. Their acquisition will require visits to the New Jersey pine barrens and to the Catskill Mountains which represent the southern and northern limits respectively of our distribution area. With the increasing growth of trees, especially conifers, a windbreak has been formed which allows the continued growth in sheltered spots of southern plants such as the sand myrtle (*Leiophyllum buxifolium*). Removal of trees from original plantings is still going on, mostly European lindens, but including also some gigantic *Weigela* and *Cornus Amomum* bushes. Rabbits (which have been our greatest pest) have unaccountably decreased during the past year, but are still in sufficient number to do a great deal of damage. For example, during the past month all the leaves of our pitcher plants have been eaten off.

Herbarium.—With the help of Miss Edson during the spring months some of the critical material was mounted, especially of collections from Panama and Alaska, but much still remains in the storeroom.

Herbarium Material Loaned.—

	Sheets
American Fern Society, Brooklyn, N. Y.	7
Beetle, Dr. Alan A., Agricultural Experiment Station, University of California, Davis, Calif.	651
Blake, Dr. S. F., Arlington, Va.	4
Boivin, Mr. Bernard, Cambridge, Mass.	20
Gregory, Dr. M., University of Virginia, Charlottesville, Va.	8
Morton, Mrs. James, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.	16
Schweinfurth, Mr. Charles, Botanical Museum, Harvard University, Cambridge, Mass.	3
Shaver, Dr. J. M., George Peabody College for Teachers, Nashville, Tenn.	1
Underwood, Dr. J. K., University of Tennessee, Knoxville, Tenn.	2
U. S. National Herbarium, Washington, D. C.	1
	713

HERBARIUM MATERIAL BORROWED FOR STUDY.—

Beetle, Dr. Alan A., Agricultural Experiment Station, University of California, Davis, Calif.	133
Blake, Dr. S. F., Arlington, Va.	1
Davis, Prof. R. J., University of Idaho, Southern Branch, Pocatello, Idaho	1
Gray Herbarium, Cambridge, Mass.	157
Lepage, Rev. Ernest, École d'Agriculture, Rimouski, Québec, Canada	13
Lundell, Dr. C. L., University of Michigan, Ann Arbor, Mich.	1,143
Marie-Victorin, Dr. F., Montreal Botanical Garden, Montreal, Canada	3
New York Botanical Garden, Bronx Park, New York, N. Y.	2,202
O'Neill, Rev. Hugh, The Catholic University of America, Washington, D. C.	19
Rogers, Mrs. Charles H., Princeton, N. J.	6
Runyan, Hon. Robert, Brownsville, Texas	53
U. S. Forest Service, Washington, D. C.	2
U. S. National Herbarium, Washington, D. C.	139
	3,872

Respectfully submitted,

HENRY K. SVENSON,
Curator of the Herbarium.

REPORT OF THE HORTICULTURIST FOR 1943

TO THE ACTING DIRECTOR:

I submit herewith my report for the year ending December 31, 1943.

Twelve men left the Garden in the course of the year—a greater labor turnover than we have had for many years. Three went into the Armed Forces; and several engaged in war industry. Their places were filled by women and older men.

Good progress was made in the reorganization of the Conservatories in accordance with a plan proposed by a committee consisting of Dr. Reed, Dr. Gundersen, Miss Dorward and the Horticulturist.

The winter of 1942–43 severely injured many deciduous shrubs and trees; the flowering cherries in particular suffering badly from frost cracks. The Rose Garden was especially hard hit, necessi-

tating 380 replacements. For these we are indebted to Bobbink & Atkins, 249; The Conard Pyle Company, 26; Jackson & Perkins Company, 55; and Traendly & Schenck, 50.

The widespread interest in vegetable gardening resulted in a greatly increased number of requests for information which were answered by telephone, in person, and by mail.

A section of a small vegetable garden demonstrating depth of planting, spacing, etc. was installed in the Ingersoll Memorial Library and was on exhibition from April 6th to April 18th.

Part of a collection of fuchsias intended for exhibition at the International Flower Show (not held in 1943) was shown at an exhibition held for the benefit of the American Red Cross by the Horticultural Society of New York.

The limestone fountain basin in the Horticultural Section showed signs of disintegration as a result of weathering. It was repaired and waterproofed by the Obelisk Waterproofing Company. As a further precaution against winter injury covers were made and installed by our men for this, the Conservatory fountain, and the well-head in the Medicinal Garden.

Termites having attacked the Japanese Garden fence it became necessary to remove the posts from contact with the soil. To this end the laboring force made 37 concrete blocks and assisted outside carpenters in repairing and resetting the fence.

Personal activities included service on the Editorial Board of The Home Garden; the Greater New York Victory Garden Council and on its Executive Committee; and judging vegetables at the Kings County Victory Fair.

I gave 2 courses of lectures for Victory Garden Precinct Leaders of the C.D.V.O. and prepared material for a Victory Garden "work sheet" of which 250,000 copies were printed by the C.D.V.O. for distribution. In addition to the courses scheduled in the Prospectus, I gave 22 talks and demonstrations on vegetable growing.

Respectfully submitted,

MONTAGUE FREE,
Horticulturist.

REPORT ON THE LIBRARY FOR 1943

To the Acting Director:

The library added to its collection of Rafinesque's works twelve originals, including his Alsographia Americana and his Autikon Botanikon. A most useful gift was the gift by the Woman's Auxiliary of Webster's New International Dictionary of the English Language, 2d edition, 1943. From the Estate of Anna and Katherine Hollwegs, former members of the Garden, a gift of fourteen volumes was received. Ninety-one books were collected and turned over to the 1943 Victory Book Campaign. In connection with the Victory Garden Campaign the library had a display of catalogs of dealers in vegetable seeds. An exhibit of old herbals was displayed for the meeting of the Herb Society of America on May 4th.

The collections at present comprise 45,016 pieces of which number 23,219 are volumes and 21,797 are pamphlets, an increase of 267 volumes and 565 pamphlets, or 832 pieces during 1943. Volumes purchased totaled 153. Gifts during the year were 81 volumes, 372 pamphlets, and 936 parts. The list of donors is included in Appendix I.

Of periodicals and other serials the library received 488 as exchanges, 90 as gifts, 99 as purchases, and 5 through publication, making a total of 682 titles.

Loans to other institutions totaled 32 items; 2 items were borrowed from other libraries for the use of our staff.

Respectfully submitted,

William E. Jordan,
Librarian.

Statistical Report on the Library

Accessions

	Autograph Letters	*Portraits*	*Volumes*	*Pamphlets*	*Parts (Including Periodicals)*
Exchange	0	0	33	97	3,149
Gift	0	29	81	372	936
Publication	0	0	0	82	48
Purchase	5	2	153	14	714
Total	5	31	267	565	4,847

Books, pamphlets, and serials catalogued	872
Total number of cards typewritten and filed	1,480
Torrey Botanical Club index cards filed during 1943 making a total of 63,857	1,284
Number of users of the Library	3,230
Books lent to members of the staff	1,651
Reference questions	414

American Fern Society Collection

Total number of volumes in American Fern Society Collection, December 31, 1943	62
Total number of pamphlets	326
Number of parts added during 1943	28

REPORT OF THE RESIDENT INVESTIGATOR (FERNS) FOR 1943

To the Acting Director:

I submit herewith my report for the year ending Dec. 31, 1943. In genetic and botanical research, I have maintained the greenhouse collections of Nephrolepis species and varieties, and of a number of native fern species cared for under lath shelter in the Experimental Field. The scientific interest which attaches to the Nephrolepis variants has recently found expression in another text citation, a book by Julian Huxley in the field of evolution. I would note again that the general fern collection comprises a good selection of this group of the most primitive stem of the higher plants, those with vascular tissue. In addition to its botanical interest, it includes also most if not all of those fern species which have been and still are well adapted for house plant culture.

The Brooklyn Botanic Garden is one of the centers of fern study and interest both in this country, and internationally, through the fact that it is headquarters for many of the activities and collections of the American Fern Society. Dr. Svenson as Treasurer, Miss Rusk as Librarian, and Curator of the Fern Society Herbarium, my own association as one of the editorial staff of the *American Fern Journal*, and the Garden storage and management of all the back files of the *Fern Journal's* nearly

thirty-five years of publication—all these combine with Dr. Svenson's fern research and my own, to carry the Garden's contributions to fern study widespread.

I have taken an active part during the past summer in the establishment of an up-State work-study summer session for Brooklyn College students at the N. Y. Agricultural and Technical Institute at Morrisville, N. Y. One hundred and fifty city students who had volunteered for service on the food production front, were quartered in the dormitories of the Morrisville Institute. There they also met daily with a regular Brooklyn College staff of teachers, taking and completing a series of regular college courses most of which were specially correlated with the rural environment. From the Institute as headquarters they went forth daily to pick peas and beans for market and canning factory use. Their total production for the summer was 22,000 bushels of these essential foods. This project, which it is hoped may be an exemplar for an expanded and continued city-country educational program, has had the enthusiastic support of state, and federal, as well as city educational agencies.

Respectfully submitted,

RALPH C. BENEDICT,
Resident Investigator (Ferns).

REPORT OF THE RESIDENT INVESTIGATOR (ECONOMIC PLANTS) FOR 1943

TO THE ACTING DIRECTOR:

I herewith submit a report for the year 1943. With the consent of the Garden, the Brooklyn Botanic Garden—Long Island University Course dealing with Economic Botany was omitted during the academic year 1942–1943. Several student groups from Long Island University were instructed in the taxonomy of medicinal and other economic plants, by use of the Botanic Garden Conservatories and Grounds.

During the summer of 1943, a survey dealing with the availability of drug plants in approximately 2,000 nurseries in the States of New York, New Jersey, Connecticut, and Massa-

chusetts was completed. The results of this survey as a contribution to the War Effort in terms of specific information regarding medicinal plants will be published in the immediate future.

My research this year involved a continuation of my investigations to determine the physiological effects of the various substitute teas being used more widely during this current war period than under normal conditions. Several species of Rosa (Hips) and Rubus (leaves) were given special attention. During the Spring, the medicinal plants in the Botanic Garden were treated in a semi-popular fashion for publication in the July issue of the Garden *Record*. This work was organized by Dean C. W. Ballard of the College of Pharmacy, Columbia University, with the collaboration of the Resident Investigator (Econ. Plants) of the Brooklyn Botanic Garden; and Professor F. J. Pokorny of Columbia University.

Respectfully submitted,

RALPH H. CHENEY

Resident Investigator (Economic Plants).

FINANCIAL STATEMENT FOR 1943

Ia. Tax Budget January 1, 1943–June 30, 1943

Accounts	*Balances, December 31, 1942, of appropriations for period 7/1/42–6/30/43*	*Expenditures 1/1/43–6/30/43*	*Balance June 30, 1943*
Personal Service			
Salaries—Regular Employees	$31,352.50	$30,494.15	$ 858.35
Wages—Temporary Employees	11,069.50	9,659.56	1,409.94
Total Personal Service	$42,422.00	$40,153.71	$2,268.29
Other than Personal Service			
Supplies, Equipment, Materials, Repairs and Services	4,879.02[1]	4,853.49	25.53
Totals	$47,301.02	$45,007.20	$2,293.82

Ib. Tax Budget July 1, 1943–December 31, 1943

	Appropriations for period 7/1/43–6/30/44	*Expenditures 7/1/43–12/31/43*	*Balance December 31, 1943*
Personal Service			
Salaries—Regular Employees	$65,325.00	$31,943.06	$33,381.94
Wages—Temporary Employees	23,696.00	12,982.50	10,713.50
Total Personal Service	$89,021.00	$44,925.56	$44,095.44
Other than Personal Service			
Supplies, Equipment, Materials, Repairs and Services	6,568.97	4,098.08	2,470.89
Totals	$95,589.97	$49,023.64	$46,566.33

[1] Includes transfer of $236.09 transferred from Code 5442 109 "Fuel Supplies" to Codes 5442–101 "Office Supplies," 5442–104 "Printing, Binding and Reproduction Supplies," 5442–149 "Other Operating and Maintenance Supplies," 5442–408 "Repairs to Buildings and Structures" and 5442–409 "Repairs to Office and Other Operating Equipment," in accordance with Board of Estimate of resolution dated July 15, 1943.

Permanent Funds (Restricted[1])	*Principal*	*Balance January 1, 1943*	*Income*	*Expenditures*	*Balance December 31, 1943*
1. Endowment Fund	$55,238.67	$ 0.00	$ 2,208.78	$ 2,208.78	$ 0.00
2. Life Membership	11,068.08	0.00	442.74	442.74	0.00
3. George C. Brackett	560.89	10.99	22.40	27.35	6.04
4. Cary Library Fund	2,248.71	12.37	89.92	90.99	11.30
5. Benjamin Stuart Gager	15,180.91	289.36	607.22	447.80	448.78
6. Martha Woodward Stutzer	10,913.34	3.10	437.54	389.19	51.45
7. Mary Bates Spalding	2,974.64	82.65	118.95	0.00	201.60
8. Alfred T. White	272,304.99	0.00	10,892.16	10,892.16	0.00
9. A. Augustus Healy Bequest	10,809.60	0.00	432.37	432.37	0.00
10. Robert B. Woodward Bequest	27,030.73	0.00	1,081.19	1,081.19	0.00
11. Endowment Increment Fund	65,013.32	0.00	2,536.21	2,536.21	0.00
12. A. T. White Memorial Tablet	4,248.33	0.00	169.88	169.88	0.00
13. Brooklyn Institute Centennial	32,336.03	0.00	1,293.44	1,293.44	0.00
14. John D. Rockefeller, Jr.	265,062.22	0.00	10,602.47	10,602.47	0.00
15. Citizens Endowment	269,191.38	0.00	10,767.63	10,767.63	0.00
16. Henry W. Healy Trust	54,608.53	171.80	2,019.14	935.46	1,255.48
17. Mrs. H. C. Folger Fund	1,005.29	29.86	40.23	35.00	35.09
18. John W. Frothingham	10,000.00	0.00	400.00	400.00	0.00
19. F. E. W. Fund	250,000.00	0.00	10,000.00	10,000.00	0.00
20. Ellen Eddy Shaw Endowment	24,472.67	963.58	975.16	297.06	1,641.68
21. Herbarium Endowment	4,000.00	64.26	160.00	165.18	59.08
22. Public Instruction Endowment	2,234.93	132.85	89.37	25.00	197.22
Totals	$1,390,503.26	$ 1,760.82	$ 55,386.80	$ 53,239.90	$ 3,907.72
Special Accounts (Restricted)					
23. Ella Reussner Trust Income Account		$ 449.12	$ 2,072.11	$ 2,037.60	$ 483.63
24. Sustaining Membership		609.76	1,216.18	1,326.14	499.80
25. Annual Membership		275.99	3,292.95	2,527.12	1,041.82
26. Tuition and Sales		1,627.33	16,288.84	16,829.15	1,087.02
27. Collections Fund		260.71	4,884.19	3,979.21	1,165.69
28. Special Purposes		4,946.59	7,650.89	8,225.93	4,371.55
29. Plant Pathology Research		0.00	6,500.00	6,500.00	0.00
30. Special Contributions		2,812.87	69,179.41	60,242.42	11,749.86
Totals		$10,982.37	$111,084.57	$101,667.57	$20,399.37
Gross Totals	$1,390,503.26	$12,743.19	$166,471.37	$154,907.47	$24,307.09
Deduct inter-account transactions			71,632.71	71,632.71	
Grand Totals	$1,390,503.26	$12,743.19	$ 94,838.66	$ 83,274.76	$24,307.09

[1] To the educational and scientific work of the Garden.

III. Summary of Total Maintenance Budget for Calendar Year 1943

	Income			*Expenditures*			
	Personal Service	*Other than Personal Service*	*Total*	*Personal Service*	*Other than Personal Service*	*Total*	*Balance*
Balance at Dec. 31, 1942 of Tax Budget Appropriations 7/1/42–6/30/43	$ 42,422.00	$ 4,879.02[1,2]	$ 47,301.02	$ 40,153.71	$ 4,853.49	$ 45,007.20	$ 2,293.82[2]
Tax Budget Appropriation 7/1/43–6/30/44	89,021.00	6,568.97	95,589.97	44,925.56	4,098.08	49,023.64	46,566.33
Total	$131,443.00	$11,447.99	$142,890.99	$ 85,079.27	$ 8,951.57	$ 94,030.84	$48,860.15
Less Balance at 12/31/43 of Tax Budget Appropriation for 7/1/43–6/30/44	44,095.44	2,470.89	46,566.33				46,566.33
Tax Budget (47.20%)	87,347.56	8,977.10	96,324.66	85,079.27	8,951.57	94,030.84	2,293.82[2]
Private Funds (52.80%)	71,992.28	35,589.57	107,581.85	60,242.42	23,032.34	83,274.76	24,307.09
Totals	$159,339.84	$44,566.67	$203,906.51	$145,321.69	$31,983.91	$177,305.60	$26,600.91[2]

[1] Includes transfer of $236.09 transferred from Code 5442–109 "Fuel Supplies" to Codes 5442–101 "Office Supplies," 5442 104 "Printing, Binding and Reproduction Supplies," 5442–149 "Other Operating and Maintenance Supplies," 5442 408 "Repairs to Buildings and Structures" and 5442–409 "Repairs to Office and Other Operating Equipment," in accordance with Board of Estimate resolution dated July 15, 1943.

[2] Balance of $2293.82 remaining from City Appropriation 1942–1943 reverted to City of New York—"General Accrual Fund."

Respectfully submitted,
Edna A. Palmitier,
Acting Secretary.

Note: The above "Financial Statement" is a transcript of Brooklyn Botanic Garden Accounts in the books of the Treasurer of the Brooklyn Institute of Arts and Sciences. The Treasurer's accounts are audited annually by a Public Accountant, and a separate audit of this "Financial Statement" is not made in order to save unnecessary expense.

Edwin P. Maynard,
Treasurer.

APPENDIX I

GIFTS RECEIVED DURING 1943

Collections Fund *

Mrs. Helen K. Anderson
Mrs. Frank L. Babbott
Battle Pass Chapter—D.A.R.
Philip A. Benson
Miss Dorothy L. Betts
Mrs. S. Parkes Cadman
Mrs. Otis D. Carroll
Mrs. Franklin Chace
Mrs. Walter V. Cranford
Walter H. Crittenden
Otto Ebel
Mrs. William W. Emerson
Mrs. Ida M. Faron
Mrs. Lewis W. Francis
Mrs. Ernest P. Goodrich
Mrs. J. Morton Halstead
Anonymous
Anonymous
Mrs. Raymond V. Ingersoll
William L. James
Mrs. Warren Kenny
Dr. Laura A. Kolk
Mrs. John E. Leech
Miss Hilda Loines
Mrs. George Lyons
Mrs. Edwin P. Maynard
Thomas Mehring
Mrs. Whitney Merrill
Mrs. Dean C. Osborne
Dr. Mabel H. Otis
Mrs. Charles E. Perkins
Mrs. W. Sterling Peters
Mrs. James H. Post
Mrs. Frederic B. Pratt
Mrs. Benjamin Prince
Miss Mary S. Pullman
Norman Roy
Mrs. Frank E. Simmons
Miss Elise W. Stutzer
William J. Wason, Jr.
Mrs. Walter F. Wells
Miss Harriet H. White
Women of '76 Chapter N.S.D.A.R.
Frank Uthoff
Anonymous

Total amount contributed $3,354.00

Plant Pathology Research Fund

Anonymous	$1,500.00	
Anonymous	2,500.00	$4,000.00

Ellen Eddy Shaw Endowment Fund

Mrs. Joseph Dugan	$ 2.00	
Miss Sadie Hecht—4 Series F Bonds ($25.00 face value)	74.00	$ 76.00

* Note:—Contributions to the Brooklyn Botanic Garden constitute proper deductions under the Federal Income Tax Law.

Special Gifts for Children's Work

John F. Struse	$ 10.00	
Mrs. A. Sanders	3.53	
Mrs. Charles Perkins	25.00	$ 38.53

Special Needs of the Garden

Anonymous	$ 500.00

Special Purposes Designated by Donors

Mrs. Dean C. Osborne	$ 920.00	
Anonymous	500.00	
Woman's Auxiliary	500.00	
Anonymous	250.00	
Goodman Family	50.00	
Miss Sadie Hecht—1 Series F Bond ($25.00 face value)	18.50	$2,238.50

Library

A total of 81 books, 372 pamphlets and 936 parts of publications (exclusive of Government documents) in addition to 29 portraits and photographs, and 76 miscellaneous items were received as gifts. A list of donors follows.

Agricultural Insecticide and Fungicide Association
Sr. J. C. Ahumada
American Association of Botanical Gardens and Arboretums
American Begonia Society
American Fern Society
American Forest Products Industries
American Forestry Association
American Horticultural Society
American Museum of Natural History
American Potash Institute
American Soybean Association
Prof. Oakes Ames
Dr. Conrado F. Asenjo
Astronomical Society of the Pacific
Miss Elizabeth M. Back
Prof. L. H. Bailey
Barclay Madison Corporation
Dr. Thomas J. Barrett
Miss Katharine Bartlett
Bartlett Tree Research Laboratories
Mr. William J. Beecher
Dr. Ralph Curtiss Benedict
Mrs. E. A. Bergstrom
Berkshire Garden Center
Bernice P. Bishop Museum
Biochemical Research Foundation of the Franklin Institute
Dr. P. Böhner
Mr. Anthony A. de Bole
Dr. Miriam L. Bomhard
Dr. Gregorio Bondar
Botanical Society of Edinburgh
Prof. Donald D. Brand
Dr. E. Lucy Braun
British Columbia Provincial Museum
British Museum (Natural History)
Brooklyn Botanic Garden Woman's Auxiliary

Mr. J. G. Brown
Mr. S. C. Bullenkamp
Dr. Stanley A. Cain
Canadian Seed Growers Association
Prof. Martin Cardenas
Carnegie Institution of Washington
Miss Gladys Carroll
Charles Lathrop Pack Forestry Foundation
Chilean Nitrate Educational Bureau
Cincinnati. Board of Park Commissioners
Mrs. Jay Clark, Jr.
Mr. I. W. Clokey
College of the City of New York
Colorado State College Library
Dr. W. S. Cooper
Cranberry Canners, Inc.
Mrs. Joseph M. Cudahy
Mr. William T. Davis
Davison Chemical Corporation
Mr. H. De Forest
Difco Laboratories
Prof. Erling Dorf
Duke University
DuPont de Nemours & Company, Inc.
Mr. Theodore P. Dykstra
Ecuador. Universidad Central
Dr. W. H. Emig
Eugenics Society of Northern California
Mrs. D. E. Eyles
Dr. David Fairchild
Dr. Oliver A. Farwell
Prof. H. I. Featherly
Rev. John Fernand
Field Naturalists' Club of Victoria
Filson Club
Fisher Scientific Company
Food Research Institute, Stanford Univ.
Mr. Montague Free
Dr. C. Stuart Gager
Mrs. C. Stuart Gager
Mr. A. O. Garrett
George Washington Carver Foundation, Tuskegee Institute
Mr. Tom Gill
Mr. Harold S. Gladwin
Dr. Arthur Harmount Graves
Dr. Ernest Guenther
Dr. T. P. Haas
Mr. Stuart K. Harris
Mr. Stanley W. Hayes
Miss Sadie Hecht
Hon. James J. Heffernan
Herb Society of America
Miss Elizabeth Hess
Mr. Henry Hicks
Estate of Anna Hollwegs
Mr. R. E. Horsey
Dr. Homer D. House
Mr. John T. Howell
Huntington College Botanical Garden and Arboretum
Dr. Annie M. Hurd-Karrer
Mr. Blythe Hurst
Illinois Audubon Society
Mr. Charles F. Jenkins
John Innes Horticultural Institution
Miss Edith D. Johnston
Mr. Arthur Pierson Kelley
Mr. E. B. Kester
Dr. Walter Knoche
Dr. Laura A. Kolk
Mr. L. F. Lambert
Dr. Frederic T. Lewis
Life Magazine
Dr. Walter F. Loehwing
Lombard, Illinois. Park District
Prof. B. J. Luyet
Mahogany Association, Inc.
Mr. David S. Marx
Medical Society of the County of Kings
Merck and Company, Inc.
Dr. E. D. Merrill
Michigan State College. Dept. of Farm Crops

Middle America Information Bureau
Montevideo. Museo de Historia Natural
Dr. R. M. Moscoso
Mr. Robert Moses
Mr. R. M. Myers
National Council of State Garden Clubs, Inc.
National Cotton Council of America
National Farm Chemurgic Council
National Lumber Manufacturers' Assoc.
National Peanut Council, Inc.
National Research Council
National Research Council of Canada
Mr. R. A. Nemanick
New Hampshire, University of. Biological Institute
New Jersey State Horticultural Society
New York Assoc. of Biology Teachers
New York Historical Society
Northwest Crop Improvement Assoc.
Dr. William H. Over
Pan American Sanitary Bureau
Pan American Union
S. B. Penick & Company
Mr. H. L. Penman
Pennsylvania University Library
Miss Emilie L. Platt
M. René Pomerleau
Mr. A. E. Porsild
Pratt Institute Library
Mr. Hugh M. Raup
Dr. George M. Reed
Riverside Public Library
Rubber Manufacturers Assoc., Inc.
Miss Hester M. Rusk
Prof. Alfred Russell
Prof. Bryce Ryan
St. Bonaventure College
Miss Claire Sanders
Miss Ethel Sanders
Dr. A. Scharf
School Garden Association
School Nature League
J. F. Seagram & Sons, Inc.
Dr. H. W. Shimer
Sociedad Mexicana de Historia Natural
Sociedad Venezolana de Ciencias Naturales
Southern Methodist University
Stanford University Library
Stanford University Natural History Museum
Dr. W. M. Stanley
Dr. W. C. Steere
Prof. Robert Stratton
Dr. Vincente Suárez Soto
Dr. Henry K. Svenson
Tennessee University Library
University of Texas
Mrs. Elizabeth H. Thomson
Prof. Henry W. Thurston, Jr.
Timber Engineering Company
Transylvania College
U. S. Golf Assoc. Green Section
Dr. Paul D. Voth
Miss Florence E. Wall
Wallerstein Laboratories
Prof. John Walton
West Virginia University Herbarium
Dr. P. R. White
Wilderness Society
Mr. Stuart Winston
University of Wisconsin, Botany Manual Fund
Mr. J. G. Wood
Dr. Albert Hazen Wright
Mr. L. C. Wyman
Yale University School of Forestry

Department of Plants

Living Plants

Bernhardt, Capt. A. A., Port Eads, La. 25 miscellaneous plants.
Bixby, Mr. Charles, Brooklyn, N. Y. 6 clumps *Dentaria laciniata*.
Bobbink & Atkins, Rutherford, N. J. 40 Sugar Maple seedlings, 2 *Correa pulchella*, 250 *Rosa multiflora*, 12 Standard Roses, 244 Roses in 58 varieties.
Chace, Mr. Franklin, New York, N. Y., 3 clumps of *Asclepias tuberosa*.
Conard Pyle Co., West Grove, Pa. 26 Roses in 13 varieties.
de Bole, Mr. Anthony A., New York, N. Y., Several dozen American Artichoke tubers.
De Tomasi, Mrs. J., Cold Spring Harbor, L. I. 288 Orchids in 30 species, 4 Bromeliads.
Flowerfield Bulb Farm, Flowerfield, L. I. 1 Peony.
Jackson & Perkins, Newark, N. Y. 58 Roses in 15 varieties.
Kittredge, Miss E. M., Vergennes, Vt. 26 miscellaneous plants in 18 genera.
Lewis, Mr. Allen, Basking Ridge, N. J. 5 Cereus, 1 Opuntia.
Meerloo, Mrs. L. S., Brooklyn, N. Y. 1 Pandanus.
Miller Gardens, Orlando, Fla. 50 Caladiums in 25 varieties.
Narodney, Lt. Leo. H., N. Y., N. Y. 6 *Myristica fragrans*.
Phillips, Dr. W., Great Neck, L. I. 15 Orchids in 6 species.
Platt, Mr. Rutherford, N. Y., N. Y. 1 clump *Sabatia Kennedyana*.
Silvers, Mr. R., N. Y., N. Y. 1 *Salvia rutilans*.
Thacher, Mrs. A. B., South Orange, N. J. 6 *Salix gracilistyla* Miguel.
Totty's, Madison, N. J. 132 Greenhouse Chrysanthemums in 45 varieties.
Traendly, Mr. F. H., Rowayton, Conn. 50 Roses "Mrs. F. D. R."
Tricker, Wm., Saddle River, N. J. 42 Tropical Waterlilies.
Wayman, R., Bayside, L. I. 1 hardy Fig.
White, Mr. Alain, Summerville, S. C. 3 *Petalostemum corymbosus*.
Winnefeld & Blume, Hackensack, N. J. 100 Poinsettia cuttings.
Wollny, Mr. W., Brooklyn, N. Y. 20 Caladiums in 7 varieties, 40 Gloxinias in 3 varieties.

Seed Packets

Bernhardt, Capt. A. A., Port Eads, La. (6)
Dossick, Mr. J. J., N. Y., N. Y. (6)
Dowd, Lt. D., Camp LeJeune, N. C. (1)
Doyle, Mr. C. B., Washington, D. C. (2)
Jones, Mr. A. D. T., Jamestown, R. I. (1)
Jones, Dr. D. F., New Haven, Conn. (1)
Murrill, Dr. W. A., Gainesville, Fla. (1)
Senior, Mr. R. M., Cincinnati, Ohio. (1)

Phanerogamic Herbarium

Demeritt, Prof. H. B., 4 Picea specimens collected in Maine.
Ericson, Mr. Charles, 19 miscellaneous specimens collected in New York.
Hastings, Mr. G. T., 808 miscellaneous specimens collected in California.
Hevle, Miss F. M., 3 miscellaneous specimens collected in New York.
Holtzoff, Mrs. Mary, 39 miscellaneous specimens collected in New York.
O'Neill, Rev. Hugh, 2 miscellaneous specimens collected in the Philippines.

Cryptogamic Herbarium

Diddell, Mrs. W. D., 1 specimen of Hypopterygium collected in Florida.

For the Department of Elementary Instruction

Coates, Mr. John C., Dahlias in different varieties for the children's garden.
Gager, Mrs. C. Stuart, Two gold medals as prizes for outdoor garden work; one framed photograph of Dr. Gager for the children's clubroom.
Garden Teachers Association, One prize cup competed for by the boys of the outdoor garden.
Shaw, Miss Ellen Eddy, Two gold honor pins for work in the children's garden.
Woman's Auxiliary, One prize cup, in memory of Mrs. Glentworth R. Butler, competed for by the girls of the outdoor garden.

Note: Gifts of money ($164.53) from various sources have been added to the Funds of the Department and are included in the financial report.

Miscellaneous

Gibson, Miss Gertrude, Brooklyn, N. Y., 250 flower pots, one ladder, and one roll of wire mesh.
Lawrence, Mrs. Herbert, Brooklyn, N. Y., 89 miscellaneous articles of laboratory equipment.
Metropolitan Museum of Art, New York City, about one-half ton of Tufa Rock.
National Coffee Department of Brazil, New York City, 1 book, "Travel in Brazil," and one "Atlas Estatistico do Brasil."
Nixon Nitration Works, Nixon, N. J., 2 plastic plates, displaying samples of objects made of cellulose acetate and cellulose nitrate.
Peabody Museum of Natural History, New Haven, Conn., 1 plastotype model of *Cycadeoidea fisheri.*
Perkins, Mrs. Charles E., Brooklyn, N. Y., 2 metal flower holders.

APPENDIX 2

PUBLICATIONS BY THE BOTANIC GARDEN PERSONNEL DURING 1943

Ashwell, G. Elizabeth.

9 abstracts for *Biological Abstracts.*

Benedict, Ralph C.

Genetics. *Brooklyn Bot. Gard. Record* **32**: 83. April.

Report of the Resident Investigator (Ferns) for 1942. *Brooklyn Bot. Gard. Record* **32**: 117, 118. April.

Dr. C. Stuart Gager. *American Fern Jour.* **33**: 143, 144. December.

Cheney, R. H.

Economic Plants. *Brooklyn Bot. Gard. Record* **32**: 83, 84. April.

Report of the Resident Investigator (Economic Plants) for 1942. *Brooklyn Bot. Gard. Record* **32**: 118. April.

Medical uses of drug plants cultivated in the Medicinal Plant Garden of the Brooklyn Botanic Garden. (In collaboration with C. W. Ballard and F. J. Pokorny.) *Brooklyn Bot. Gard. Record* **32**: 187–208. July.

Review of "The Green Earth" by Harold W. Rickett. *Gardeners' Chronicle of America* **47**: 213. August.

3 interviews on *Tea substitutes*, *Ersatz drinks*, and *Blossomades.*

Doney, Charles F.

4 articles on Shrubs and other woody plants, published in *Horticulture*, *Bulletin* of the *Brooklyn Institute of Arts and Sciences*, and *N. Y. Times.*

Dorward, Margaret M.

Paper white narcissus. *Gardeners' Chronicle.* November.

Free, Montague.

Pocket book of flower gardening. *Pocket Books, Inc.*, New York, N. Y.

City slickers: roses can endure urban surroundings. *Amer. Rose Ann. 1943:* 55–58.

Report of the Horticulturist for 1942. *Brooklyn Bot. Gard. Record* **32**: 107–112. April.

Twenty-two gardening articles in *The Home Garden* and 15 in the *New York Sun*.

Gager, C. Stuart.

Review of W. Stephen Thomas, "The amateur scientist." *Science* **97**: 44–45. January 8.

Book notice of Selman A. Waksman, "The peats of New Jersey and their utilization." *Ecology* **24**: 134. January.

Book notice of Bennett and Pryor, "This land we defend." *Ecology* **24**: 134. January.

Thirty-second annual report of the Brooklyn Botanic Garden: Report of the director. *Brooklyn Bot. Gard. Record* **32**: 43–74.

Review of Sverdrup, Johnson, and Fleming, "The oceans: their physics, chemistry, and general biology." *Ecology* **24**: 271. April.

Brooklyn Botanic Garden and the schools. *Chronica Botanica* **7**: 308. Spring, 1943.

Graves, Arthur Harmount.

Spruces of the eastern United States. *School Nature League Bulletin*. Series 13. No. 6. National Audubon Society, N. Y. C. February.

Making new chestnut trees. *Brooklyn Central* **42**: 4–16. February.

Report of the Curator of Public Instruction for 1942. *Brooklyn Bot. Gard. Record* **32**: 84–91. April.

Chestnut breeding work in 1942. *Brooklyn Bot. Gard. Record* **32**: 78–80. April.

Botany. Revision service (for 1942). *Colliers National Encyclopedia*. April.

A brief historical survey of the use of plants in medicine. *Brooklyn Bot. Gard. Record* **32**: 169–186. July.

5 articles on items of interest in the Brooklyn Botanic Garden. In the *Bulletin* of the *Brooklyn Institute of Arts and Sciences*.

65 articles on events at the Brooklyn Botanic Garden, for metropolitan newspapers.

2 abstracts for *Biological Abstracts*.

Gundersen, Alfred.

Flower structure and the classification of dicotyledons. *Brooklyn Bot. Gard. Record* **32**: 81–82. April.

Report of the Curator of Plants for the Year 1942. *Brooklyn Bot. Gard. Record* **32**: 96–100. April.

Flower forms and groups of dicotyledons. *Bull. Torrey Bot. Club* **70**: 511–517. September.

Jordan, William E.

Report on the Library for 1942. *Brooklyn Bot. Gard. Record* **32**: 114–117. April.

A short list of works in the Library of the Brooklyn Botanic Garden dealing with the early use of plants in medicine. *Brooklyn Bot. Gard. Record* **32**: 208–209. July.

Reed, George M.

Plant Pathology. *Brooklyn Bot. Gard. Record* **32**: 75–78. April.

Melanopsichium on *Polygonum aviculare*. *Mycologia* **35**: 654, 655. December.

Phytopathology—1867–1942. *Torreya* **43**: 155–169. December.

Shaw, Ellen Eddy.

Annual Report of the Curator of Elementary Instruction. *Brooklyn Bot. Gard. Record* **32**: 91–96. April.

3 articles on children's gardening, published in *The Home Garden*.

Shaw, Ellen Eddy, Michalena LeFrere Carroll, and Elsie Twemlow Hammond.

Our Boys and Girls Club. *Educational series, Dept. of Elementary Instruction*. April.

Shaw, Ellen Eddy and Margaret M. Dorward.

Selection and care of plants in the classroom. *School Nature League Bulletin*. October.

Svenson, Henry K.

Report of the Curator of the Herbarium for 1942. *Brooklyn Bot. Gard. Record* **32**: 102–107. April.

Modern taxonomy and its relation to geography. *Torreya* **43**: 44–49. July.

Flora of Panama. Part II. Fascicle 2 (Cyperaceae). *Ann. Mo. Bot. Gard.* **30**: 281–326. September.

Utter, L. Gordon.

C. Stuart Gager. *Gardeners Chronicle of America* **47**: Chronicle Insert—September.

Gardening for Victory. 30 weekly articles for *The Gateway*, Floral Park, N. Y.

Victory Garden Tips. 25 weekly articles (with C. F. Wedell).

APPENDIX 3

TALKS, LECTURES, ADDRESSES, AND PAPERS GIVEN BY THE BOTANIC GARDEN PERSONNEL DURING 1943

By G. Elizabeth Ashwell:

April 30. *Our common trees.* Garden Club of New Utrecht Reformed Church.

July 17. *Economic plants in wartime.* New Canaan Garden Club.

2 talks on *Soil erosion*, and *Mountains*, before biology class and nature club.

By R. H. Cheney:

February 8. *Wartime flavors from United States plants.* Illustrated by lantern slides in color. East Orange, N. J. Garden Club.

February 27. *Thirst quenchers for the duration.* Illustrated by lantern slides and demonstration material. New York Botanical Garden (Saturday Afternoon Lecture Series).

By Elizabeth Clarke:

October 5. *Bulbs for spring bloom.* Garden Center of New Rochelle.

November 8. *House plants.* Brooklyn Heights Garden Club.

12 talks on Victory Gardens.

By Charles F. Doney:

October 6. *Flowering shrubs.* Rockville Center Garden Club.

December 3. *Christmas evergreens.* Brooklyn Heights Garden Club.

2 talks, one on *Trees and Shrubs* and one on the *Brooklyn Botanic Garden.*

By Margaret M. Dorward:

5 talks on *Victory Gardens* before various organizations.

2 lectures in the special *Victory Garden Courses* given at Bloomingdale Bros., Inc., for the A.W.V.S.

By Montague Free:

18 talks on *Victory Gardens* and 6 talks on various subjects to Garden Clubs and other organizations.

By C. Stuart Gager:

April 8. *Larger aspects of the activities of the Brooklyn Botanic Garden,* with statistics, during the first 32 years. Brooklyn Institute Trustees. Academy of Music, Brooklyn.

April 15. *Accomplishments and needs of the Brooklyn Botanic Garden,* 1942–43. Woman's Auxiliary of the Garden. At the Garden.

By Arthur Harmount Graves:

January 16. *Breeding the chestnut.* Class of Prof. Martin L. Robertson at N. Y. Univ. on Modern Advances in Science.

March 8. *Medicinal Plants.* At the Garden.

March 25. *Food Plants of the World. I. Cereals.* P. S. 42, Manhattan.

April 27. *The Brooklyn Botanic Garden.* Bayside Garden Club.

May 18. *Forestry.* P. S. 42, Manhattan.

May 26. *Chestnut breeding.* Stuyvesant H. S., Manhattan.

October 19. *The work of the Brooklyn Botanic Garden.* South Strathmore Garden Club. At the Garden.

October 27. *Soil conservation.* Class in Hygiene and Public Health from Brooklyn College. At the Garden.

December 11. *Breeding chestnut trees.* Saturday morning Children's Class. At the Garden.

December 18. *How we are defeating the chestnut blight.* Class in Modern Advances in Science. N. Y. Univ.

By Alfred Gundersen:

March 31. *Classifying plants.* N. J. State Teachers College. At the Garden.

May 20. *The history of food plants.* Contemporary Club. At the Garden.

By Frances M. Miner:

4 talks on *Victory Gardens.*

4 talks on *Children's Gardens.*

3 talks on gardening subjects.

1 lecture before Bloomingdale Bros., Inc. employees at the Greater New York A.W.V.S. Headquarters.

By George M. Reed:

April 20. *Disease resistance in plants, with particular reference to the genetical aspects.* Federal Plant Quarantine Club of New York.

May 8. *Genetics of oat smut inheritance.* Biology Class in the Teaching of Biological Science, New York University. At the Garden.

May 10 and 11. *Oat smut experiments.* Biology class, Brooklyn College. At the Garden.

By Hester M. Rusk:

July 14 and October 25. *Edible wild plants.* Flushing Garden Club and Three Village Garden Club.

November 15. *Plant ecology.* Madison Garden Club, Madison, N. J.

November 28. *Wild flowers and their fruits.* Barnard Club, New York.

By Ellen Eddy Shaw:

March 28. *The children's garden at the Brooklyn Botanic Garden.* St. Christopher's School, Dobbs Ferry, N. Y.

June 9. *The garden check-up.* Three Village Garden Club, Syosset, L. I.

October 2. *The educational value of gardening for children.* Queensboro Federation of Mothers' Clubs, Inc., at the Hotel Pennsylvania.

November 17. *In memory of Dr. Gager.* Woman's Auxiliary of the Brooklyn Botanic Garden.

November 19. *Thanksgiving.* Girls' High School.

November 23. *The Brooklyn Botanic Garden.* Woman's Guild, Bedford Presbyterian Church.

4 *Graduation addresses.*

5 *Victory Garden talks.*

4 talks on *Children's gardens.*

3 talks on the *Brooklyn Botanic Garden.*

7 lectures in special *Victory Garden Courses* at Bloomingdale Bros., Inc. for the A.W.V.S., and the Board of Education and Boy Scouts at the Garden.

By Henry K. Svenson:

February 12. *The species problem.* Sigma Delta Epsilon Scientific Society. At the Cornell Club Rooms, Barbizon Hotel, New York, N. Y.

April 21. *Plants of a Long Island pond.* Torrey Botanical Club. At the Garden.

5 talks on *Ecuador and Peru.* Before various organizations.

By S. R. Tilley:

April 19. *Rose growing.* Strathmore Village Garden Club, Manhasset, L. I.

By L. Gordon Utter:

40 talks on *Victory Gardens* before various organizations.

APPENDIX 4

RADIO TALKS GIVEN DURING 1943

From Station WNYC:

January	8.	The story of rubber.	Dr. Graves
January	22.	The story of tea and coffee.	Miss Ashwell
February	5.	Garden soil and its problems.	Miss Shaw
February	19.	Sugar and sugar substitutes.	Dr. Gundersen
March	5.	Planning the vegetable garden.	Mr. Free
March	19.	Seeds to choose for the children's garden.	Miss Miner
April	2.	Planting the vegetable garden.	Miss Shaw
April	16.	Try growing herbs.	Miss Van Brunt
April	30.	Flowers for victory.	Miss Clarke
May	14.	Plant protection and our chemical supplies.	Dr. Utter
May	28.	Substitutes for coffee and tea.	Miss Rusk
June	11.	Summer care of the victory garden.	Miss Shaw
June	25.	Spices and substitutes.	Mr. Doney
July	13.	Keep your victory garden growing.	Mr. Free
October	15.	Plants and people.	Mr. Free
October	29.	How did your victory garden grow?	Dr. Utter
November	12.	The long, long way from love apple to victory garden tomato.	Mr. Doney
November	26.	"Every herb bearing seed . . . to you it shall be for meat."	Miss Rusk
December	10.	Plants for Christmas.	Miss Shaw

From Station WOR:

April	20.	An interview.	Mr. Free
October	12.	Battle of the Boroughs Quiz Program.	Miss Shaw

From Station WEAF:

April	17.	Victory Garden Program from the Schwab Estate.	Mr. Free

From Station W75NY:

March	4.	An interview.	Mr. Free

APPENDIX 5

FIELD TRIPS CONDUCTED, 1943

April 11. Torrey Botanical Club. Brooklyn Botanic Garden; for important economic plants outdoors and in the conservatories. Dr. Graves and Dr. Gundersen

June 5. Torrey Botanical Club. Brooklyn Botanic Garden and Prospect Park to see rare and exotic trees. Miss Ashwell

September 26. Torrey Botanical Club. Van Cortlandt Park. Dr. Graves

October 10. Torrey Botanical Club. Richmond, S. I. Miss Rusk

October 17. Torrey Botanical Club. Gymnosperms at the Brooklyn Botanic Garden. Dr. Graves and Dr. Gundersen

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APPENDIX 6

MEETINGS OF ORGANIZATIONS AT BROOKLYN BOTANIC GARDEN, 1943

January 13. O.C.D. Leaders.
January 20. O.C.D. Leaders.
January 27. O.C.D. Leaders.
February 3. O.C.D. Leaders.
February 10. O.C.D. Leaders.
April 11. Torrey Botanical Club.
April 15. Woman's Auxiliary, Brooklyn Botanic Garden.
April 21. Torrey Botanical Club.
May 4. American Herb Society.
May 4. Winters Night Club.
May 4. Brooklyn Section, Public School Kindergarten Association.
May 5. N.S. D.A.R., '76 Chapter.
May 8. D.A.R., Battle Pass Chapter.
May 8. Association of Kew Gardeners in America.
May 12. North Country Garden Club.
May 20. Contemporary Club.
June 1. American Nature Study Club.
June 11. N.S.D.A.R., Ellen Hardin Walworth Chapter.
June 24. Brooklyn Nature Club.
August 31. Kings County War Saving Staff.
September 23. Conference on Fruit and Vegetable Storage.
October 5. Torrey Botanical Club.

October 5. Department of Natural History, Brooklyn Institute.
October 17. Torrey Botanical Club.
October 19. Strathmore Garden Club.

APPENDIX 7

STATISTICS OF SCHOOL SERVICE

	1942	1943
Loan Lectures (Lantern Slides, etc.)		
No. of sets lent	26	22
No. of teachers involved	72	122
No. of pupils attending	3,084	6,305
Material Supplied		
Total number of requests from schools	513	347
Number of different institutions	226	184
High Schools and High School Annexes		
Brooklyn (Total No. 38)	16	18
Queens (Total No. 27)	7	6
Manhattan (Total No. 53)	5	7
Other Boroughs (Total No. 32)	4	6
Junior High Schools (Total in Brooklyn 31)	4	8
Colleges and Universities (Total in Brooklyn 7)	12	7
Elementary Schools		
Brooklyn (Total No. 227)	125	78
Queens (Total No. 147)	8	5
Manhattan (Total No. 126)	9	7
Other Boroughs (Total No. 150)	12	21
Private and Parochial Schools	12	12
Other Institutions	12	9
Number of potted plants for nature study	2,371	1,235
Number of Petri dishes filled with sterilized agar	695	381
Total number of teachers supplied with material	5,518	5,026
Total number of pupils reached	256,586	208,542
Living Plants Placed in School Rooms		
No. of schools	23	29
No. of plants	663	1,002
No. of teachers involved	451	882
No. of pupils reached	15,710	32,370
Plants Distributed (Raised in Classes)	38,309	24,765
No. of persons taking plants	1,216	859
Total number of schools represented	210	149

Seed Packets for Children		
No. of schools	663	480
No. of teachers	16,380	86,230
No. of pupils	438,551	440,756
No. of packets	1,315,653	1,322,268
Exhibits Provided		
No of exhibits	9	19
Viewed by	119,665	151,250

APPENDIX 8

STATISTICS RELATING TO LIVING PLANTS

	Species or Varieties	*Plants*
Living Plants Received:		
By collection	1	1
By exchange	69	228
By gift	292	1,541
By purchase	60	1,034
Total	322	2,804

Seed Exchange

Seed Packets Received:	
By exchange	81
By gift	19
By purchase	137
Total	237
Seed Packets Distributed:	
By exchange	525
By gift	3
Total	528
Plants and Cuttings Distributed:	
By exchange	6,654
By gift	1,022
Total	7,676

APPENDIX 9

HERBARIUM ACCESSIONS AND DISTRIBUTION

Phanerogamic Herbarium

Accessions:

By Gift:

Demeritt, Prof. H. B., University of Maine, Orono, Maine	4	
Ericson, Mr. Charles, Brooklyn, N. Y.	19	
Hastings, Mr. George T., Santa Monica, Calif.	808	
Hevle, Miss F. M., New York, N. Y.	3	
Holtzoff, Mrs. Mary, New York, N. Y.	39	
O'Neill, Rev. Hugh, The Catholic University of America, Washington, D. C.	2	875

By Exchange:

Bazuin, Mr. C. W., Grand Rapids, Mich.	171	
Beetle, Dr. Alan A., Agricultural Experiment Station, University of California, Davis, Calif.	130	
Field Museum of Natural History, Chicago, Ill.	18	
Gray Herbarium, Cambridge, Mass.	200	
Hanes, Mr. C. R., Schoolcraft, Mich.	2	
Howell, Mr. J. T., California Academy of Sciences, San Francisco, Calif.	1	
Lundell, Dr. C. L., University of Michigan, Ann Arbor, Mich.	21	
O'Neill, Rev. Hugh, The Catholic University of America, Washington, D. C.	43	
Pennell, Dr. F. W., The Academy of Natural Sciences, Philadelphia, Pa.	228	
Peters, Mr. G. H., Freeport, Long Island, N. Y.	2	
Rosengurtt, Mr. Bernardo, Monzon Heber, Estacion Juan Jackson, Uruguay, South America	61	
Sharp, Dr. A. J., University of Tennessee, Knoxville, Tenn.	150	
U. S. Department of the Interior, Washington, D. C.	2	
U. S. Forest Service, Washington, D. C.	2	
U. S. National Herbarium, Washington, D. C.	68	
Whitehouse, Dr. Eula, University of Texas, Austin, Texas	13	1,112

By Collection:

Ashwell, Miss G. Elizabeth, Brooklyn Botanic Garden	1	
Graves, Dr. A. H., Brooklyn Botanic Garden	5	
Rusk, Miss H. M., Brooklyn Botanic Garden	1	7

By Purchase:

Hastings, Mr. George T., Santa Monica, Calif.	135	
Kittredge, Miss E. M., Vergennes, Vt.	166	301
		2,295

Distribution:

By Exchange:

Blake, Dr. S. F., Arlington, Va.	1	
Davis, Prof. R. J., University of Idaho, Southern Branch, Pocatello, Idaho	3	
Gray Herbarium, Cambridge, Mass.	107	
Lepage, Rev. Ernest, École d'Agriculture, Rimouski, Québec, Canada	48	
New York Botanical Garden, Bronx Park, New York, N. Y.	260	
Ogden, Dr. E. C., University of Maine, Orono, Me.	13	
Peters, Mr. G. H., Freeport, Long Island, N. Y.	28	
Underwood, Dr. J. K., University of Tennessee, Knoxville, Tenn.	71	
U. S. National Herbarium, Washington, D. C.	186	717

By Gift:

Blake, Dr. S. F., Arlington, Va.	2	
Logue, Dr. E. G., Williamsport, Pa.	2	
Otis, Dr. M. H., Moline, Ill.	15	19
		736

CRYPTOGAMIC HERBARIUM

Accessions:

By Gift:

Diddell, Mrs. W. D., Jacksonville, Florida	1 moss

By Collection: 2,105 fungi

APPENDIX 10

REPORT OF PHOTOGRAPHIC WORK

Negatives on file December 31, 1942	10,600
Negatives accessioned during 1943	200
Total negatives on file December 31, 1943	10,800
Lantern slides on file December 31, 1942	7,130
Lantern slides accessioned during 1943	95

Total lantern slides on file December 31, 1943		7,225
Prints on file December 31, 1942		10,600
Prints made during 1943	768	
Prints used or distributed	568	
Prints filed during 1943		200
Total prints on file, December 31, 1943		10,800
Enlargements made		79

APPENDIX 11

REPORT ON BROOKLYN BOTANIC GARDEN PUBLICATIONS, 1943

Ecology

Official Organ of the Ecological Society of America. Quarterly. Volume XXIV comprised 32 papers (besides reviews, proceedings, and miscellaneous matter), 520 pages, 1 plate and 157 text figures (as against 35 papers, 500 pages, 2 plates and 182 text figures in 1942). The circulation at the close of the fiscal year (November 30, 1943) was 893 as against 951 one year ago.

The annual budget was $7,656.36, the credit balance $2,126.39, and assets over liabilities $2,135.29 (as against $6,189.78, $2,631.56 and $1,704.09 assets over liabilities in 1942), plus the value of back sets and volumes on hand. Dr. Henry K. Svenson continued on the editorial board as the Brooklyn Botanic Garden representative. Dr. Thomas Park, of the University of Chicago, continued as Zoological Editor. Dr. Charles E. Olmsted, of the University of Chicago, continued as Botanical Editor.

Genetics

In Cooperation with "Genetics, Incorporated." Bimonthly. Volume XXVIII comprised 36 papers, 542 pages, 7 plates and 81 text figures (as against 39 papers, 664 pages, 7 plates and 123 text figures in 1942). At the close of the fiscal year (November 30, 1943) the circulation was 565, the annual budget $8,104.33, and the credit balance $4,022.57 (as against 585, $8,754.78, and $3,249.11 in 1942), plus the value of back sets and volumes on hand. Dr. M. M. Rhoades, of Columbia University, continued as Managing Editor.

Brooklyn Botanic Garden Record

Quarterly. Volume XXXII comprised 232 pages. The April number comprised the Annual Report. The circulation of the Record at the close of the year was 1,299.

Leaflets

No *Leaflets* were issued.

Contributions and Memoirs

Numbers 98 and 99 of the *Contributions* were published. No *Memoir* was published.

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Through Other Departments	170	186
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Sustaining Members		
Through the Botanic Garden	19	
Through Other Departments	152	171
Annual Members		347
Total, as of December 31, 1943		877

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PRIVILEGES OF MEMBERSHIP IN THE BROOKLYN BOTANIC GARDEN

The Brooklyn Botanic Garden renders a public service in its endeavor to advance a knowledge of plants, affording educational advantages, and carrying on fundamental investigations. Members of the Garden have the opportunity of furthering these aims.

Special membership privileges are also offered as follows:

1. Advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, and the best ways to grow plants successfully, involving methods of culture, and control of insect and fungous pests.
2. The naming of botanical specimens submitted for determination.
3. Periodical distribution of surplus ornamental plant material and seeds.
4. Invitations for self and friends to the Annual Spring Inspection, and to spring and fall "Flower Days"; cards of admission to all exhibitions and openings preceding the admission of the general public, and to receptions; admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Services of a guide (by appointment) for self and party, when visiting the Garden.
6. Free tuition in all courses of instruction, except that in laboratory courses a small fee is charged to cover cost of materials, etc.
7. The Library and Herbarium are available for consultation.
8. Announcement cards concerning plants in bloom and the activities of the Garden are sent to members from time to time.
9. As part of its services, the Brooklyn Botanic Garden issues publications of general horticultural interest, and technical papers based upon the researches carried on at the Garden. Special *Guides* to the plantations and collections, *Leaflets* of popular information, and the quarterly *Record,* which includes the *Annual Report* of the Garden's activities, are sent free to members.
10. Membership privileges in other botanic gardens and museums outside of Greater New York are offered to our members when they are visiting other cities and on presentation of Brooklyn Botanic Garden membership card.

CLUB MEMBERSHIPS

For many years the Botanic Garden has had the pleasure of cooperating in numerous ways with Garden Clubs, Women's Clubs, and other organizations of the Metropolitan area, and a plan has been adopted whereby such organizations may become definitely identified with the work of the Garden in promoting an interest in plant life and horticulture, as follows:

Annual Memberships.—Garden Clubs or other organizations may qualify as Annual Members of the Garden on election by the Board of Trustees and payment of the annual membership fee of Ten Dollars. Each annual member club may designate one of its officers or other member to receive such invitations, notices, and publications as go to individual annual members and to represent the club at all Botanic Garden functions, including "Flower Days" and the annual Spring Inspection in May.

The Club may also have the following privileges:

a. *The services of a Botanic Garden docent or guide* for a tour of the plantations or conservatories, followed by tea. No parties of less than six adults will be conducted. Schedule for such events must be arranged for in advance, at dates mutually convenient to the Botanic Garden and the Club.

b. *One extra-mural lecture a year* by a member of the Garden staff. The Garden supplies, on request, a list of staff members available for outside lectures.

Arrangements will be facilitated if the Club will, with each request, designate at least two names.

c. One member of the club is entitled annually to free tuition in courses of instruction for which tuition is charged to non-members. In Laboratory Courses a nominal fee is charged to cover cost of material.

Sustaining Memberships.—Any club or other organization may become a Sustaining Member of the Garden on election by the Board of Trustees and annual payment to the Garden of the sustaining membership fee of Twenty-five Dollars.

Sustaining membership clubs enjoy the full privileges of annual membership, not only in the Botanic Garden but also in the Brooklyn Museum and The Institute at the Academy of Music. They may designate three members who may receive free tuition in Botanic Garden courses of instruction for which tuition is charged to non-members. They are entitled each year to two extra-mural lectures free, by a lecturer chosen from the Garden's list of lecturers.

OUT-OF-TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco, Calif.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Cranbrook Institute of Science, Bloomfield Hills, Mich.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Field Museum of Natural History, Chicago, Ill.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, Calif.

CLASSES OF MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1. Annual, by annual payment of	$ 10
2. Sustaining, by annual payment of	25
3. Contributing, by annual payment of ..	100
4. Life, by one payment of	500
5. Permanent, by one payment of	2,500
6. Donor, by one payment of	10,000
7. Patron, by one payment of	25,000
8. Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members also enjoy the special privileges indicated on a preceding page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Main 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used exclusively for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical research.
3. The endowment of special gardens and collections.
4. The Library.
5. The Herbarium.
6. Extending and enriching our work of public education.
7. The purchase and collecting of plants.
8. Popular botanical publication.
9. Illustrations for publications and lectures.
10. The beautifying of the grounds.

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (total cost, about $300,000), and other permanent improvements to a total of more than $281,000, has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation. Certain salaries are paid, in whole or in part, from private funds.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase with private funds all publications for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items. These collections, available without charge for public use, are the property of the Trustees.

The interest on One Million Dollars at the rate of 3.5 per cent, added to the present private funds income, would restore that income to the 1930 figure. The director will be glad to give full information as to the uses for which such additional income is needed.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Oriental Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists, and the public in general, may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 301, or by mail (1000 Washington Avenue), or by telephone (MAin 2–4433).

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GENERAL INFORMATION

MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Main 2–4433.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

TO ASSIST MEMBERS and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

TO REACH THE GARDEN take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or McDonald-Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. BY AUTOMOBILE from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Papers:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk. By Norman Taylor. 1923. 108 pages. $1.00.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 96. Inheritance of smut resistance in hybrids of Navarro oats. By George M. Reed. 7 pages. 1942.

No. 97. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1941. By Arthur Harmount Graves. 5 pages. 1942.

No. 98. Flower forms and groups of Dicotyledones. By Alfred Gundersen. 7 pages. 1943.

No. 99. Phytopathology 1867–1942. By George M. Reed. 15 pages. 1943.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail, 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, by mail, 30 cents.

Guide No. 14. The local flora section (native wild flower garden) of the Brooklyn Botanic Garden. 27 pages, 18 illustrations. By Henry K. Svenson. Price, by mail, 30 cents.

Guide No. 15. The Herb Garden of the Brooklyn Botanic Garden. 42 pages; 2 illustrations and map. By Elizabeth Remsen Van Brunt and Virginia Riddle Svenson. Price, by mail, 30 cents.

Guide No. 16. The Medicinal Plant Garden of the Brooklyn Botanic Garden. 45 pages, 12 illustrations. By Arthur H. Graves, Charles W. Ballard, Ralph H. Cheney, and F. J. Pokorny. Price, by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.

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BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXIII APRIL, 1944 NO. 2

C. STUART GAGER

AND THE

BROOKLYN BOTANIC GARDEN

PUBLISHED QUARTERLY

BROOKLYN BOTANIC GARDEN

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Blackstone, N. Y.

C. Stuart Gager

DECEMBER 23, 1872—AUGUST 9, 1943

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXIII APRIL, 1944 NO. 2

C. STUART GAGER

AND THE

BROOKLYN BOTANIC GARDEN

EVENTS LEADING TO THE FOUNDING OF THE GARDEN

"A botanic garden and arboretum for the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same, and for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people . . ." New York State Law, 1897.

The proposal for the establishment of a botanic garden in Brooklyn was promoted actively during the last decade of the nineteenth century by officials and members of the Brooklyn Institute of Arts and Sciences. The first concrete move was the appointment of a committee of the Institute on February 26, 1897, to consider the advisability of drawing up a New York State Legislative Act reserving the East Side Lands, an area of about thirty-nine acres, then known as Institute Park, for a botanic garden and arboretum. On March 5, the Board of Trustees approved an act presented by the committee and, soon thereafter, Hon. George W. Brush, M.D., a Senator from Brooklyn, introduced a bill in the State Legislature providing for carrying out the provisions of the act, this bill being passed on May 18.

A second step was taken in October, 1898, when Professor Franklin W. Hooper was authorized to prepare a form of amendment to the constitution of the Institute regarding the appointment of a standing committee of the Board of Trustees, to be known as the Committee on Botanic Garden and Arboretum. The amend-

FIG. 1. The Laboratory Building, July 1, 1936. (9232)

ment was prepared and adopted by the Board, and the first Botanic Garden committee* appointed.

Little progress was made toward establishing the garden and arboretum for several years. At a meeting of the Board of Trustees of the Institute, held in June, 1905, a communication was received from Mr. Alfred T. White stating that some friends of the Institute had authorized him to offer to it the sum of $25,000, to be used in equipping a scientific botanic garden, whose primary purpose should be the teaching of botany to students in the public and private schools in the city and to the general public, provided such a garden be established on the grounds adjacent to the Museum.

This was the final impetus for the establishment of the Garden. A bill, introduced in the State Legislature, authorizing the City to establish and maintain a garden and arboretum in Institute Park, was approved by the New York State Legislature and signed by the Governor on May 24, 1906.

On December 28, 1906, the first offer made by Mr. White was changed to a subscription of $50,000, made under the same conditions, and in the spring of 1907 a form of agreement between the City and the Institute was prepared, and approved by the Board of Park Commissioners of the City of New York in December. Finally, on June 24, 1909, it was approved by the Board of Estimate and Apportionment, and a contract was entered into between the City and the Institute on December 28, 1909, thus completing the necessary legal steps for the establishment of the Garden.

Of the many men who sponsored the movement for the establishment of a botanic garden in Brooklyn, chief credit must be given to Professor Franklin W. Hooper and Mr. Alfred T. White. The conception of a botanic garden was due to Professor Hooper, and it was as the result of his energy and enthusiasm, supported by the government and influential citizens of the City, that legislation was obtained, setting these lands apart for use as a botanic garden. The idea of having the Garden administered by the Trustees of the Brooklyn Institute of Arts and Sciences was Mr. White's, and it was he who secured the initial endowment of $50,000, required by the City as a condition of entering into a coöperative arrangement with the Institute for its establishment.

*Lowell M. Palmer, Eugene G. Blackford, Col. Robert B. Woodward, Julian D. Fairchild, and Horace J. Morse.

FIG. 2. Airplane view of Brooklyn Botanic Garden, May 30, 1940. (Photo by Fairchild Aerial Surveys, Inc.) (10058)

The Director

The success of the venture in founding the Garden depended greatly upon the wise selection of the Director, and the members of the Board of Trustees showed remarkable foresight in their choice of Dr. Charles Stuart Gager, at the time Professor of Botany in the University of Missouri. His educational and scientific training, and his experience in teaching and research, eminently fitted him for undertaking the development of the Botanic Garden.

Following his graduation from Syracuse University, where he received the bachelor's degree in 1895, Dr. Gager acquired, during the next fifteen years, a wealth of varied experiences in botanical teaching and research. The years 1895-1904 were spent in teaching and advanced studies, with emphasis on botany. During 1895-1896 he was Vice Principal of the Ives Seminary, Antwerp, N. Y. The next year, 1896-1897, he was a student at the New York State Normal College, Albany, N. Y., where he obtained the two degrees, Bachelor and Master of Pedagogy. In the fall of 1897 he became Professor of Biological Sciences and Physiography at that institution, holding the position until September, 1904. He attended the Harvard Summer School in 1898, and was at Cornell University during 1901-1902, for graduate study and as Assistant in Botany. He obtained his degree of Doctor of Philosophy in June, 1902, from Cornell, carrying on his research under the direction of Professor George F. Atkinson. He returned to Cornell as Instructor in Botany during the summer of 1904.

The years 1904-1910 were spent in research and the teaching of botany in several institutions. He was Laboratory Assistant at the New York Botanical Garden under Dr. Daniel Trembly MacDougal during 1904-1905. In the spring of 1905 he was Acting Professor of Botany at Rutgers College, N. J., and in the fall of 1905 he was teacher of botany at the Morris High School, New York. He also taught botany at the summer sessions of New York University in 1905 and 1906. In February, 1906, he succeeded Dr. MacDougal as Director of the Laboratories at the New York Botanical Garden, holding this position until August, 1908, where he devoted himself largely to research, making a

FIG. 3. Organization dinner, April, 1930. (7700)

special study of the effects of radium on plants, the results of his investigations being published in 1908 as *Memoir* 4 of the New York Botanical Garden. His interest in this subject continued throughout his life.

In September, 1908, Dr. Gager was appointed Professor of Botany at the University of Missouri. He was in charge of the general course in botany and also taught advanced courses in physiology and morphology. The general course had a large enrollment, mostly freshmen or sophomores in the College of Agriculture or the College of Arts and Science, and offered him an opportunity to round out his varied experience in botanical teaching.

Thus, when the Director assumed his duties on July 1, 1910, he brought with him a rich background of interest and experience in the field of botany, particularly with regard to botanical education. He was well acquainted with varied types of institutions—normal schools, high schools, research laboratories, and private and state universities.

Such were the resources of the man, not yet thirty-eight years of age, who was appointed to direct the great undertaking of building a botanic garden in Brooklyn. These resources would have been of little value for this particular work had they not been coupled with Dr. Gager's broad vision and purposeful plans. From the very beginning he was determined to build not merely a local botanic garden, but an institution which would be entitled to take a prominent place among the botanic gardens of the world.

How great was his vision may best be understood by recalling what he saw on that July day when he first surveyed the land which had been assigned to botanic garden purposes. Standing on the southeast corner of the Prospect Hill Reservoir, now Mount Prospect Park Playground, he could overlook practically all the land that later became incorporated into the grounds. A few years before, the Park Department had made some improvements, throwing up a border mound along Flatbush and Washington Avenues. A few trees were planted, and walks extended through the area. Towards the east was an uninviting-looking pond and, in the distance toward Malbone Street, now Empire

FIG. 4. Laboratory Plaza with Magnolias in bloom. Daffodils on Boulder Hill, April 17, 1937. (9425)

Boulevard, the area was used as a dump ground by the Park Department where, almost daily, bonfires of rubbish were burning.

The question of how best to utilize this not too attractive expanse of unimproved park land was, of course, uppermost in his mind. As he viewed the situation and drew upon his background and experience, he envisaged plantations containing trees, shrubs, and herbs of botanical interest, and groupings of horticultural varieties illustrating the progress in their development, as well as their utilization in beautifying the grounds. Interwoven with these plans was the idea of popular education in the field of botany and horticulture for the people of Brooklyn, and the need for contributions in botanical research fitting to an institution such as he wished to create.

Most fortunate was the young Director of the Garden to have associated with him Mr. Alfred T. White, Chairman of the Botanic Garden Committee. On the one hand, the technical knowledge, training and experience in botanical science of the younger man, on the other, the generosity, interest, and kindly understanding of the older man, combined with the vision, enthusiasm, and ability of both, laid a perfect foundation for the harmonious building of an Institution—"All that we have done at the Brooklyn Botanic Garden either could not have been done at all, or could not have been done so promptly and efficiently save, not only for the material contributions, but for the time and thought and sympathy which Mr. White put into it." Such was the tribute of Dr. Gager to Mr. White after the latter's death in 1921.

Today that same land, with an additional eleven acres, presents a sharply contrasting picture—the fulfillment of the Director's vision—a Botanic Garden of great beauty which contributes to botanical science the world over through research and which offers, from the plantings, library, and herbaria, educational, recreational, and cultural opportunities to the people living in or near Greater New York.

In his first Annual Report, Dr. Gager presented a list of types of plantations which might be established. These included sections on the systematic arrangement of plants, a local flora (herbaceous and woody plants growing within a radius of one hundred miles of New York City); plantings illustrating the variations in

FIG. 5. Local Flora Section view facing northwest, showing pool and sand area, September 28, 1933. (8508)

morphology, and ecological requirements of plants, and areas devoted to economic and horticultural features. He also presented an outline of organization by departments, including staff members for administration, research, instruction, and other activities. As the years passed by and funds became available, many of his ideas were translated into actualities. With the gradual development of the Garden, changes in view-point occurred, and while some of his plans await the future, many of them were carried to fulfillment during his administration.

FIG. 6. Scene in the Japanese Garden. Stone lantern and drum bridge at the left. Storks and East Indian Lotus (*Nelumbo*) in the Lake. Torii at the right. Laboratory Building in the middle distance. July 24, 1925. (5620)

The Plantations

The proper development of the land set aside for Garden purposes presented many difficulties, since there were few natural features upon which to base any definite plans.

As the first step, a topographic survey of the area was prepared by D. Barta & Company, previous to July 1, 1910. During the fall of 1910, the firm of Olmsted Brothers, of Brookline, Mass., was appointed landscape architects to lay out the grounds. The plan submitted by this firm was adopted in its broader outlines by both the Institute and the Commissioner of Parks of the Borough of Brooklyn.

Obviously, for the development of the Garden, it was necessary to provide for a staff of workers. Since the development of the plantations was the primary problem, the first Curatorship established was that of Curator of Plants. The duties were primarily concerned with the development and administration of the plantations, but included, also, the assembling and care of a herbarium.

The first Curator of Plants was Mr. Norman Taylor, appointed on March 16, 1911. In December, 1914, Dr. Alfred Gundersen became Herbarium Assistant and, somewhat later, Assistant Curator of the Herbarium. Finally, in 1924, he was appointed Curator of Plants, taking over the botanical phases of the Department.

From the first, horticultural activities constituted a large part of the work of the Department, but gradually became a much more prominent feature. Mr. Montague Free, in March, 1914, was appointed Head Gardener and in 1920 his title was changed to Horticulturist and Head Gardener and, later, to Horticulturist. Since January 1, 1927, the duties of administration and of developing the plantations from the horticultural standpoint have been carried on by him.

"A botanic garden needs the cooperation of the botanist and the landscape architect, for it should be not only a place where different kinds of plants are exhibited, but where they are exhibited effectively, and not only for their own sake (botanically), but as materials for decorative planting and landscaping, i. e. horticulturally." This quotation explains the idea which Dr. Gager had

FIG. 7. Winter scene in the Japanese Garden, January 4, 1923. (4408)

in mind when he planned to have the Brooklyn Botanic Garden beautifully landscaped, as well as planted to botanical specimens. In order to carry out the general basic landscape plan of the Garden as developed by Olmsted Brothers, Mr. Harold A. Caparn was appointed Consulting Landscape Architect, January 1, 1912. As the result of his supervision through the years, the perfection of carefully planned vistas, the symmetry of formal design, the subtle balance of informal plantings, and the effective use of plant material, can not escape even the most unobserving visitor at the Botanic Garden.

By enlisting "the aid of horticulture and landscape architecture to arouse and foster a wider botanical interest in plants," many persons must have added to their botanical knowledge because their interest was aroused by the beauty of the design. In this way, the Brooklyn Garden has become "the common meeting ground of horticulture and of botany," where the garden does not exist solely for the plants, nor the plants for the garden, but where the function of being "educational and otherwise serviceable from the standpoint of botany" is combined with that of beauty "as a garden."

During the early years, the grading and improvement of the soil was one of the chief problems. In this connection, one of the most interesting features was the construction of the brook. The original terminal moraine pond was enlarged to a lake and excavation, in some places to as much as seven feet, for the artificial brook was made at the same time the slope of the meadow was changed. Dams of glacial boulders were constructed, and the entire course of the brook designed to look as natural as possible. To prevent too much loss of water, the brook was lined with blue clay found when excavating for the Laboratory Building.

The water was first turned into the brook in May, 1912. This feature of the Garden was the particular joy of the Director, who was wont to refer to it as "my brook," since it was constructed upon his insistence, and against the advice and wishes of others. It has proven to be a most delightful addition to the Botanic Garden.

The primary scheme for the arrangement of the planting was developed along systematic lines. The scheme of classification fol-

FIG. 8. Glacial boulders placed along the Brook under construction, 1912. (562)

lowed was based on the Engler and Prantl system. An unusual feature in carrying out the plan was the inclusion of trees and shrubs together with the herbaceous plants in the families to which they belonged. Further, in certain families, the highly specialized horticultural groups are usually planted in the same general area. Thus, the display of chrysanthemums is nearby the family of the composites.

At present, the Garden has a collection of more than 300 species of trees, representing about 100 genera. There is a total of 275 genera of shrubs, including about 1,000 species. There are also approximately 1,000 species of herbaceous plants. The horticultural varieties, however, of trees, shrubs, and herbaceous plants, greatly increase the total number of different kinds found growing in the Garden and add very great interest to the plantations.

In the course of the season there are many special displays of ornamental plants. In the early spring, the daffodils, naturalized on Boulder Hill and elsewhere, make a fine display. About the same time the magnolias in the Plaza in front of the Laboratory Building, and the forsythia in various parts of the Garden, are in bloom. Late in April or early May come the flowering cherries and the crab apples. Doubtless, the most noted feature of the Garden is the floral display along Cherry Walk. There, well-grown and mature trees of the variety Kwánzan attract thousands of visitors for a week to ten days. Nearby are other varieties. Not far away are numerous crab apples, which add to the beauty of the scene. In the coming years, a new planting of seventy-six trees of the same variety, made in 1941, should make an attractive display.

Then follow, in succession, the blooming periods of the lilacs and wisterias, the azaleas, peonies and iris, spireas and viburnums. In late May come the roses. In the summer, the most attractive displays are the waterlilies in the pools in front of the Conservatories. There are fine collections of both hardy and tropical varieties and, in the adjacent border, are plantings of many varieties of annuals. It may be mentioned that the water-lily pools were the last gift of Mr. Alfred T. White to the Garden.

In late July and August, in the Garden lake, the East Indian lotus, with its huge flowers, makes a unique display. This plant-

FIG. 9. Willows along the Brook. Planted October, 1912. September 4, 1940. (10111)

ing of lotus, reminiscent of oriental art and sacred religious associations, and seldom found in this part of the country, is a close second to the flowering cherries as an attraction.

In the fall, we look forward to the American asters and the display of chrysanthemums, which wind up the season. Among the other attractive features of the fall are the fruits of the crab apples, the rose hips, and the berries on the beauty bush and other shrubs. An exceptionally beautiful display in the late fall is the brilliant coloration of the leaves of *Euonymus alatus compactus,* which forms a unique hedge on the Plaza in front of the building.

Many special features have been developed, and Dr. Gager quickly adopted the term, suggested by a friend of the Garden, of "Gardens within a Garden" as a very apt description. One of the earliest special developments among the plantations was the Native Wild Flower Garden, or Local Flora Section. Because of Dr. Gager's special interest in the plants growing within a hundred mile radius of New York, a section devoted to the local flora was begun in the spring of 1911. A valley 600 feet long, covering about two acres, was chosen as the site, and numerous beds for native plants not requiring special habitats were prepared, woodland conditions being provided for others.

In 1931, reconstruction of the Local Flora Section was begun on an ecological basis and it was divided into sections, each providing the very different conditions for growth which are found in the area surrounding New York City. The area was carefully landscaped to present the characteristic plants in settings which are, on a small scale, as nearly like their original natural surroundings as possible.

Conditions of full sunlight and deep woodland shade, dry sandy soil and moist rich forest humus, pond, bog, and wet meadows, limestone, serpentine and granite rock, are all found in this relatively small garden, each supporting the growth of characteristic native plants. These conditions not only provide differences in moisture, light and plant foods, but also reflect the geological areas found near New York—the sandy coastal plain, crystalline, limestone, and serpentine rock outcroppings, and mountain areas, from which the plants have been collected.

FIG. 10. Cherry Walk. View south from the north end. Fallen flowers on the ground. May 13, 1932. (8032)

The majority of the wild flowers bloom in May, but from late March or early April, when the hepaticas are the first to blossom, until fall, when the golden-rods and asters show their colorful blooms, there is something of interest to be seen in the Local Flora Section.

The next special garden to be developed was the Japanese Garden, covering about an acre, a gift of Mr. Alfred T. White in 1914. It is an oriental garden in the true sense, having been designed by a Japanese architect, Mr. Takeo Shiota, and, since 1919, has been under the care of Miss Mary Averill, Honorary Curator of Japanese Gardening and Floral Art, who spent many years in Japan devoting herself to the study of these subjects. It is a garden embodying the oriental idea of a place for contemplation, not for activity. Its beauty is maintained throughout the year by the use of rocks, which form a deep gorge in the hill bounding one side of the garden, by cascades of water flowing over these rocks into the lake, and by the use of artistically placed evergreens, the latter meticulously pruned to keep them in scale. The significance of the design of the Japanese Garden, which illustrates certain oriental ideas, and of the architectural features, may be obtained from the *Guide* written by an oriental for occidental visitors to the garden.

The beauty of the flowering cherry by the tea house and the wisteria blossoms gracefully drooping over the rocks near the waterfall are especially appreciated in the Japanese Garden because the blossoms are in contrast to the evergreens which make the background. The restrained use of single clumps of Japanese iris near the water's edge is equally enchanting. Even to those who make no attempt to understand its significance, the quiet charm of this bit of oriental landscape offers a welcome retreat from the city's tempo and noise.

In 1917, the Rock Garden was opened to the public. It contains many interesting alpine and saxatile plants. There, on a boulder-strewn slope, several hundred species of these plants, which require very specialized conditions for growth, are displayed. There is no month in the year when something of interest may not be found, but the most colorful masses of blossoms appear in May. The rocks which provide the background for this ecological exhibit

FIG. 11. Cherry Walk, May 9, 1939. Facing north. (9827)

are glacial boulders deposited during the Ice Age by one of the continental ice sheets which terminated on Long Island, and which were dug up during grading operations on the Botanic Garden grounds. They make up in authenticity and geological interest for what they may lack in value for plant culture. They vary in size from small cobblestones to boulders six feet or more in greatest dimension. Their story has been told in a Garden *Guide* and twenty-eight of them have been labeled with bronze tablets, provided by Mr. Edward C. Blum, Chairman of the Board of Trustees of the Institute, which give their composition and history. Some of the boulders came from nearby points, but one traveled with the glacial ice from the southeastern Adirondack Mountains, about two hundred and fifty miles.

Probably there is no association of season and flowers so universal as that of June and roses. Because of this fact, the opening of the Rose Garden in June, 1928, occupying an area of about an acre in the Botanic Garden, must have been as greatly appreciated by the general public as it was by rosarians. With his usual vision, Dr. Gager felt that since a rose garden would be of great beauty and educational value as a part of the Botanic Garden, it might be wise to publish in his annual report of the year 1926 a sketch of the proposed rose garden as designed by the consulting landscape architect. By unusual good fortune, the design and idea appealed to Mr. Walter V. Cranford, who happened to see the annual report, and shortly thereafter he and Mrs. Cranford gave the Garden a sum of $10,000, later increased to $15,000, to realize these plans.

Work on the garden began in June, 1927. Every effort was made to plan carefully, so that a minimum of grading and moving of soil was required. It was disconcerting, however, to find two old roads just under the surface soil, which added to the difficulties of making the soil fit for rose culture. Many roses were generously donated by nurserymen and rose growers, and by the following spring the garden was well planted. In 1936, the Rose Arc, an extension of the Rose Garden, was given by Mrs. Cranford as a memorial to her husband. The roses in the arc are planted around a central pool.

FIG. 12. Rock Garden, facing northwest, October 26, 1917. (2585)

Since the Rose Garden was planned not only to be a place of beauty, but also an educational feature, an attempt has been made to grow practically every type of rose that is hardy in this climate, and to display the types in many different ways. Roses grow wild in the Northern Hemisphere and, because cultivated varieties are derived from these wild species, it was considered of educational value to frame the rose garden with a wide border of wild roses. There was no sacrifice of beauty in this procedure, since many of the wild forms are of horticultural value because of their abundance of blossoms, such as are produced by *Rosa setigera,* the prairie rose; their interesting foliage, such as the wrinkled leaves of the *R. rugosa;* or their attractive fruit, produced by forms like *R. virginiana, R. rugosa,* and other species.

The central panel of fifteen beds of roses from the groups Noisette, Bourbon, China, tea, hybrid tea, polyantha, and hybrid perpetual, the last three groups preponderating, offers a wealth of information to persons who wish to learn about roses. The mass of blossoms on the climbing roses, so well displayed on enclosing fences, pergolas, pavilion and pillars, impresses one upon entering the Rose Garden during the season of their bloom. There are nearly twenty groups of climbing roses in the garden, totaling about eighty varieties. Their flowers are single or double, and occur either singly or in clusters.

Visitors who enjoy flowers of particular historical interest may observe a unique group of roses in one of the beds. The group includes a species mentioned by Pliny in his *Natural History,* the cabbage rose, which has been grown in Europe for two thousand years, and the damask rose, which is the source of "attar of roses."

The most recent additions to the "Gardens within a Garden" are the Herb Garden, and the Medicinal Plant Garden, which contain about fifty culinary and nearly one hundred medicinal plants, attractively arranged around two central symmetrical patterns of "knots." The knot designs are adaptations from early sixteenth century gardens, when growing herbs was a popular pastime and their design an important feature. The beauty of these knots, where foliage color and texture are carefully combined to afford interest, may best be enjoyed from the Overlook above the garden. Today, because of their intrinsic value as interesting

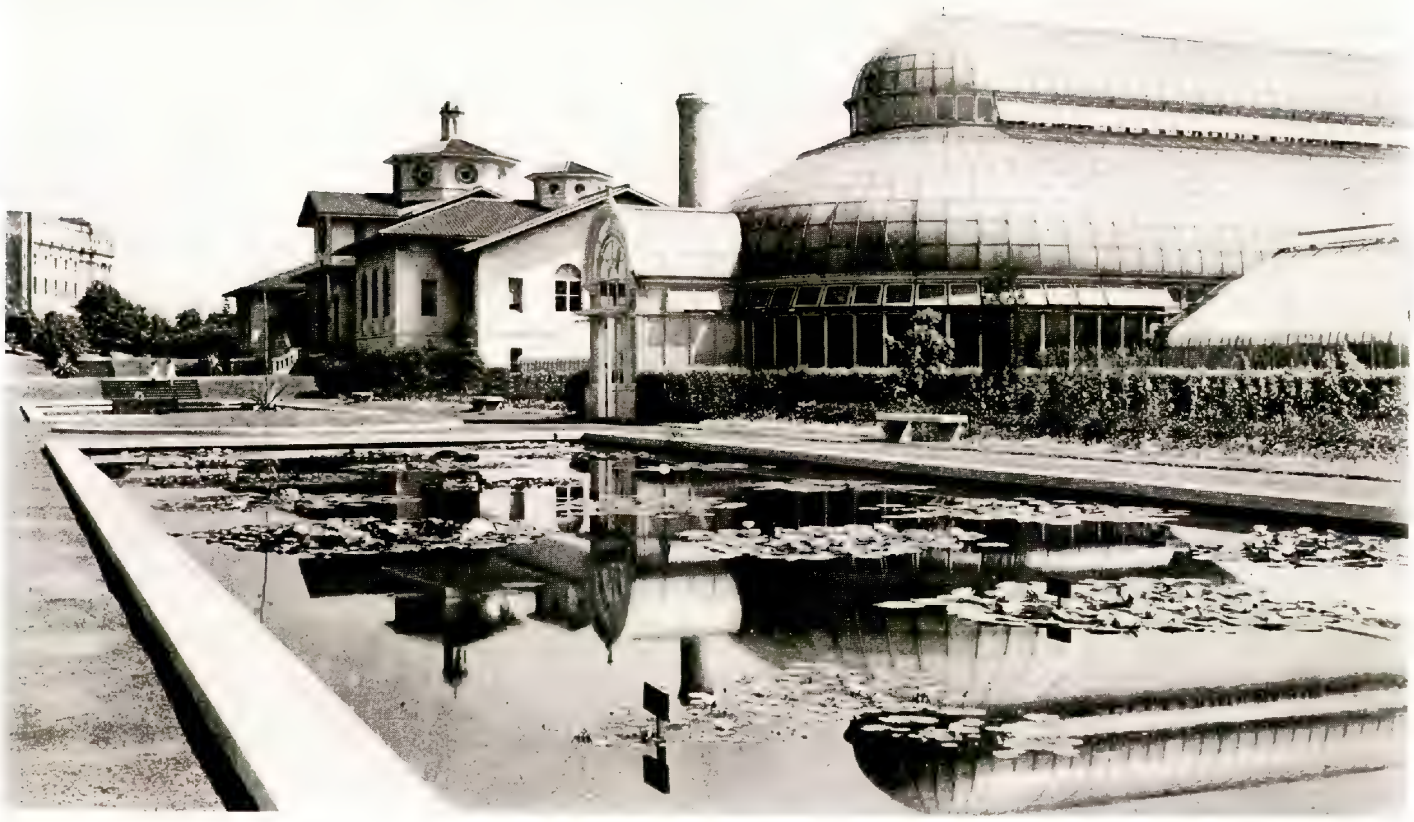

FIG. 13. Conservatory Garden. Hardy waterlilies in the near pool; tropical forms in the distant pool, July 10, 1922. (4186)

garden plants, and with importations of herbs limited at a time when foods require more careful seasoning, there has been a great revival in interest in herb gardens. Miss Elizabeth Remsen Van Brunt is Honorary Curator of Culinary Herbs.

The Medicinal Plant Garden is a realization of plans made when the Garden was founded to include such plants. Their importance in modern medicine is still great in spite of encroachment by synthetic chemicals, and their display is of interest not only to the nurses who have formal class instruction at the Garden regarding their appearance and use, but to all who seek to increase their botanical knowledge.

In a secluded spot among the pines on the shore of the lake may be found the beautiful bronze tablet, designed by Daniel Chester French, and presented to the Garden in 1923 by a committee of citizens as a memorial in recognition of Mr. White's outstanding public services, of which the Botanic Garden was only one example.

One of the most formal plantations of the Garden is the recently established Horticultural Section, in which is featured the Dean Clay Osborne Memorial, which was presented in 1939 by Mrs. Sade Elisabeth Osborne in memory of her husband. The memorial includes a fountain, water basin, seats and columns designed by the Garden's consulting architect, Mr. Harold A. Caparn, and placed in a setting of trees and shrubs of the more common horticultural varieties. Carved in the base of the Indiana limestone columns is a design of unusual beauty of ginkgo leaves and seeds.

The arbors of this section of the Garden, on which vines are trained, afford a good example of Dr. Gager's statement that at the Brooklyn Botanic Garden "an endeavor is made not only to exhibit plants as botanical specimens, but also to show how . . . the plants . . . may be used in decorative planting." In the spring, the Wall Garden, with its colorful rock plants, which marks one boundary of the horticultural plantation, is a feature.

Adding to the interest of the trees at the Garden are those which have been planted by outstanding botanists or friends of the Garden. The first trees to be so honored were a sweet-gum planted by the famous botanist Hugo deVries, September 12, 1912, and a tulip tree planted October 16, 1913, by Adolf Engler, world-renowned systematic botanist, while on visits to the Garden. At

the Second Annual Spring Inspection of the Garden, on May 9, 1916, a white oak was planted by Mr. Alfred T. White, the Garden's greatest benefactor. On the same date, a pin oak was planted by Miss Frances E. White, and a red oak by Miss Harriet H. White, sisters of Mr. White, and both generous contributors to the Botanic Garden. On the same occasion, a black oak was planted by Mr. A. Augustus Healy, President of the Board of Trustees when the Garden was established and one of its chief benefactors. Since then, several other trees have been planted, or endowed, by individuals and organizations.

Throughout the winter, the Garden's conservatories attract many visitors and students. Several sections are given over to exhibits of cacti native to the deserts of the United States and succulent plants of Africa, to collections of orchids, cycads, and varieties of Boston fern. Always of interest is the Economic House, in which are displayed tropical plants of utilitarian value, such as banana, coffee, and rubber, and which is extensively used by visiting school classes.

The group of Australian cycads housed in the conservatories has an interesting story. In 1914, Dr. Gager arranged through the Curator of the Botanic Garden, Rockhampton, Queensland, Australia, for an expedition to collect these plants for the Brooklyn Garden. They were collected, packed in large cases, and shipped. Due to war conditions, they were landed and transferred at Sydney, Port Said, and London, as in each port their ship was taken over for carrying troops. After seven months of travel they arrived at the Garden and, because of excellent packing and their natural resistance to drought, they were still alive and, by excellent care, were established in the conservatories. Such may be the romance of collecting plants.

The Laboratory Building

The center of the Garden activities and of their administration is the Laboratory Building. The original floor plans of the building were made by Dr. Gager before he left the University of Missouri. He spent many hours in working out preliminary arrangements for laboratories, classrooms, and offices. These were submitted to the architects, McKim, Mead & White, who designed the building in 1910.

Careful attention was paid to determining the architectural style of the building because of its relation to the Brooklyn Museum Building which was arranged, when completed, to open onto the Botanic Garden grounds. The Laboratory Building, with the greenhouses, then, had to be fitted in with this general plan. Consequently, it was located on Washington Avenue and a style of architecture was selected which provided for a low type of building. Modified Italian Renaissance design was chosen, and the plan of a Greek cross with a cupola at the juncture of the cross, a motif common to Lombardy chapels, was employed. As viewed from various points in the Garden, it is a very attractive structure.

Dr. Gager worked out a scheme for the treatment of the exterior of the Laboratory Building to include the placing of names of former botanists of note on the frieze and on panels under the windows. The selection of these names was the result of a vote of prominent American botanists.

For the chief place of honor, namely, the frieze, the names of twenty-two botanists were selected, Linnaeus and Darwin occupying the principal positions on each side of the main entrance. The names of forty-seven botanists were placed in the panels under the windows, and included five American botanists. A vacancy under one window was left until 1937, when the name of deVries, who had recently died, was carved.

The building houses the administrative offices, auditorium, laboratories, rooms for research, the herbaria, library, and class rooms for the work of instruction.

The first section of the building was completed and occupied September 24-26, 1913, and officially opened on December 13,

FIG. 14. Laying the corner stone of the Laboratory Building, April 20, 1916. Left: Alfred T. White. Center: A. Augustus Healy. Right: C. Stuart Gager. (2036)

1913. The corner stone of the main part of the building was laid April 20, 1916, by Mr. Alfred T. White, whose contribution of $100,000 to match an equal appropriation by the City made possible the completion of the second section of the building. The building was finished and the Dedication Ceremony was held April 19-21, 1917. At this first official gathering, members of the Board of Trustees of the Institute, municipal officers, and scientists, were present. Dedicatory addresses were made by Mr. A. Augustus Healy, Prof. John Merle Coulter, Hon. William A. Pendergast, Hon. Lewis H. Pounds, Hon. Raymond V. Ingersoll, and Dr. Gager. The large attendance by scientists was a compliment to the scientific standing of the new Director, and the three-day program of scientific papers made the occasion a memorable one.

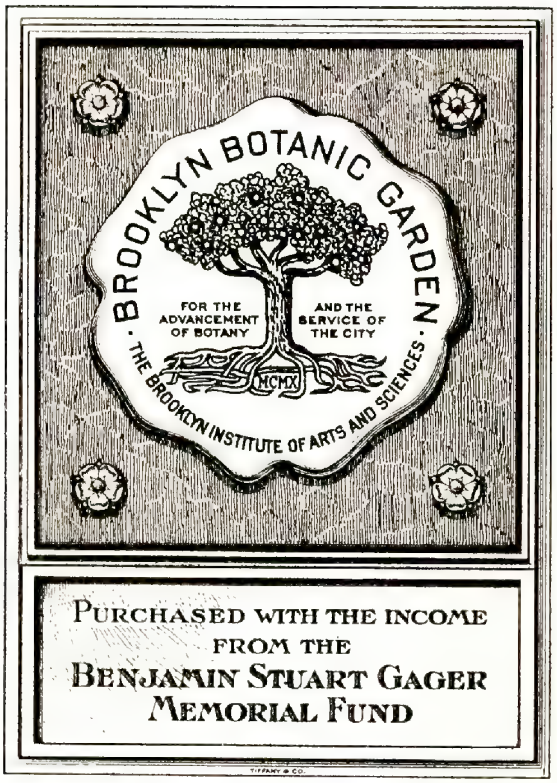

FIG. 15. Special book plate of the library.

The Library

VERUS BOTANICUS UBIQUE SCIENTIAM BOTANICES EXCOLIT OCULIS PROPRIIS QUAE SINGULARIA SUNT OBSERVAT NEC SUA SOLUM EX AUCTORIBUS COMPILAT. Linnaeus MDCCL.*

Many, on entering the library for the first time, pause to read the above inscription which, in essence, is the dictum of Agassiz, "Study nature, not books." Nature to Dr. Gager, however, was not in itself sufficient; books also were needed. Endless would be the task and hard the way of him who, in this day, would attempt to wrest a secret from plants without first searching out what had already been done in his field of endeavor. Here in the library is gathered together the accumulated and recorded knowledge of botanical workers of the past. The present collection of books and journals is a tribute to the skill with which Dr. Gager accomplished his object of assembling a well rounded botanical library, rich in early fundamental works, monographs, books, and complete sets of highly technical botanical periodicals.

The Librarian's function was at first combined with that of Secretary by Miss Bertha M. Eves. In September, 1913, the library growth necessitating full time attention, Miss Helen Virginia Stelle was appointed Librarian, followed by Miss Anna K. Fossler (Acting Librarian), Dr. Laura E. W. Benedict, Miss Ray Simpson, Mr. Calvin W. Foss, Mrs. Emilie Perpall Chichester (Acting Librarian), and Mr. William E. Jordan.

During 1911, the first year of the library's existence, subscriptions were purchased for four periodicals, and as early as October, 1912, Dr. Gager wrote of the needs of the library, and listed ten of the periodicals most urgently desired. He suggested that donors, interested in the library, might by endowment secure for it a given periodical in perpetuity.

During 1915, special stress was laid on enriching the files of current periodicals, and by the end of the year 224 titles were being received. Since the Botanic Garden issues several valuable

* Dr. Gager made the following free translation of this quotation: "The true botanist everywhere cultivates the science of botany. With his own eyes he observes those things that are noteworthy, and he does not merely compile his own works from authors."

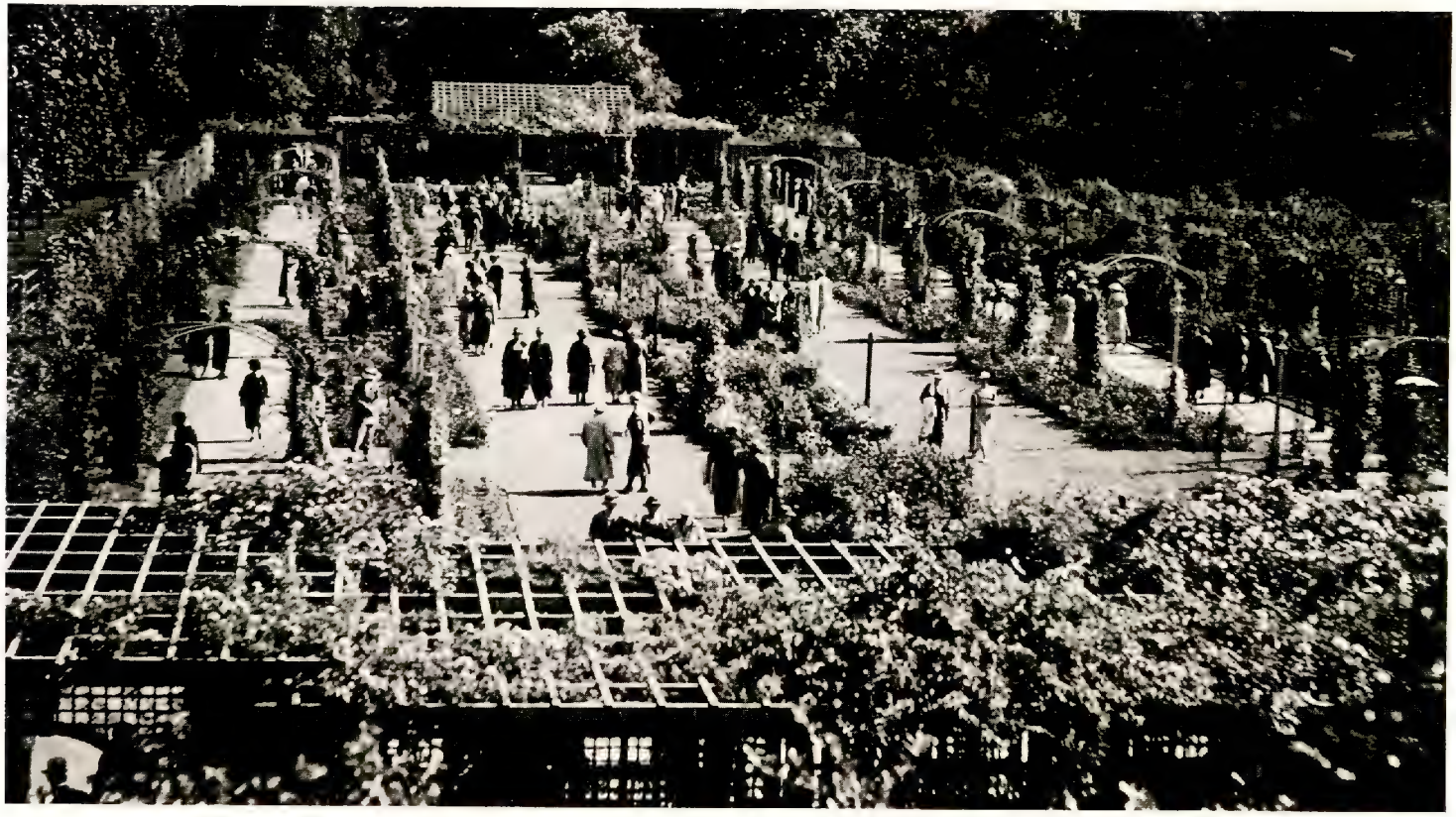

FIG. 16. The Rose Garden on Rose Garden Day, June 9, 1936. (9322)

publications of its own, an arrangement of mutual benefit was made with other institutions to exchange periodicals. As a result of exchanges, gifts, and subscriptions, the periodical and serial list doubled in the five years through 1920, increasing steadily to 1937, when it reached a peak of over 1000 titles received currently. General economic conditions and the world war have enforced a temporary decrease to about 700 in 1943. In June, 1929, the librarian stated that: "In these thirteen years the aim of the director and the librarian has been to complete the files of periodicals, serials and society transactions. The library today is rich in these completed sets. . . ."

The value of current periodicals to the staff or to any reader engaged in a botanical research problem cannot be overestimated. It is in these current publications that the most recent discoveries, the complete observations and detailed results of experiments are to be found. Dr. Gager's foresight in urging the addition of such a large number of them to the Botanic Garden library will be of lasting benefit to all who make use of the institution's resources.

The working collection of this, as of any library, is composed of the separately classified books. The story of the acquisition of this collection is, as with the periodicals, the story of the building of something of value out of nothing except an idea, a need, and the aid of interested friends. On January 1, 1911, when the first Librarian took up her duties at the Brooklyn Botanic Garden, she found herself at the head of a library which did not possess a single book, and which was temporarily housed in the Central Museum Building. If the library was, as the agreement between the City of New York and the Brooklyn Institute of Arts and Sciences stated, "to be administered as a public, non-circulating library open without charge to all properly qualified citizens," the first and obvious need was for books. The lack of books was immediately remedied by Dr. Gager's gift on that day of nine books, which formed the foundation for the present library. During 1911, over 250 books and several hundred pamphlets were received as gifts or by purchase. The purchases were limited mainly to the immediate needs of the staff for reference in laying out and planning the grounds, because of lack of space at the time to accommodate the volumes. In November of that year, the Com-

FIG. 17. Rose Garden Day, June, 1931. (7237)

Left to right: Dr. C. Stuart Gager, Mrs. Walter V. Cranford, Mr. Walter V. Cranford, Miss Hilda Loines, Mr. Edward C. Blum, Mrs. Edward C. Blum, Dr. Jean Henri Nicolas, Mr. Harold A. Caparn, Mr. Montague Free

mittee on Botanic Garden of the Brooklyn Institute of Arts and Sciences decided that, as far as practicable, all books purchased for the Botanic Garden library and binding of books should be paid for by private funds, and so become the property of the Institute. Since income from the original $50,000 endowment fund of the Garden was to be used for buying plants as well as books, the Director requested a special book fund of $5,000 to $10,000. The most pressing immediate needs of the library were met with a $1,000 gift in 1912 from Mr. Alfred T. White.

During the period through 1915, the library, which had been moved in September, 1913, to a room in the first unit of the new Laboratory Building, acquired nearly 4,000 volumes. The library moved to its present quarters on completion of the Laboratory Building in 1917. There it grew to 6,500 volumes in 1920, nearly 16,000 in 1930, and over 22,000 in 1940.

The gifts of many friends aided materially in this growth. In 1913, the *Index Kewensis* was secured through the generosity of Mr. George D. Pratt. The gift of Mrs. Annie Morrill Smith of nearly 800 volumes added important works on Bryophytes. Other volumes were given by Mrs. Clarence R. Hyde, Mr. Leonard Barron, Mr. Frank H. Ames, and Mr. William J. Studwell. Dr. Gager was a steady and frequent donor of books. The gift by Miss Harriet White of Mary Vaux Walcott's *North American Wild Flowers,* and a gift by the Pierrepont family, should be mentioned.

The value of many of the works on the shelves is enhanced by the previous ownership and signatures of such men as de Candolle, Pasteur, Darwin, and Asa Gray. Dr. Gager was ever eager to add to the collection of such association items.

Several hundred pamphlets were received by the library during its first year, and by 1942 the pamphlet collection had increased to over 21,000.

Probably no gift to the Botanic Garden library was more appreciated by the Director than the $10,000 Benjamin Stuart Gager Memorial Endowment Fund, presented anonymously in 1918. Largely by means of a portion of the income from this fund, as well as by a few gifts, a priceless collection including incunabula, pre-Linnaean, Linnaean, and post-Linnaean books of scientific

FIG. 18. Rose Arc, facing west, June, 1938. (9750)

historical interest has been made. The gift, in 1911, by Mr. Alfred T. White, of a first edition (London, 1862) of Darwin's *Fertilization of Orchids,* which laid the foundation for a collection of rare books at the Botanic Garden, must have pleased the Director, whose keen interest in the collecting of historically valuable botanical books dated back to his youth. This collection became one of great pride and satisfaction to him.

Of special interest among these rarities are the incunabula, or fifteenth century books. Just before Columbus discovered America, the *Hortuli Commentarium* of Columella, Rome, 1485, and the *De Proprietibus Rerum* of Bartholomaeus Anglicus, 1491, were being printed. The latter was the standard work on natural history throughout the Middle Ages, and the Botanic Garden library is most fortunate in having these works, as well as six other incunabula, in its collection.

Included among the more than 500 pre-Linnaean works are many herbals, "those naïve, ponderous and cyclopedic works." * They contain descriptions and illustrations by the collectors of herbs, and are well represented by the rare *Adam in Eden* of William Cole, 1657, and *The Herball, or Generall Historie of Plantes, Gathered by John Gerarde of London, Master in Chirurgerie,* 1597, which contains probably the first published illustration of the Virginia potato. Mattioli's commentary on the *Materia Medica of Dioscorides,* which listed the medicinal properties of about six hundred plants and served as the basis for medical practice for over fifteen centuries, is represented in the library by many editions.

The pre-Linnaean group also contains interesting examples of works by botanists who pioneered in exact and discriminating observation, and in experimentation. Such is *The Anatomy of Vegetables Begun,* by Nehemiah Grew, 1672, which attempted to describe anatomical features of parts of plants, Robert Hooke's *Micrographia,* 1665, and Antony van Leeuwenhoek's *Opera Omnia,* 1695-1719, which introduced a new world of microscopic "animalcules!" and made possible the science of plant anatomy soon to be introduced by Grew, and Malpighi, whose *Anatome Plantarum,* 1675-79, forms a valuable contribution in this collec-

* Bailey, L. H. *The Survival of the Unlike.* 4th ed. p. 139.

FIG. 19. Portion of Wall Garden, June 16, 1937. The entire length is about 385 feet. (9422)

tion. Simple, but most important, were the experiments by Francesco Redi which helped to disprove the theory of spontaneous generation, the 1671 edition of his *Experimenta Circa Generationem Insectorum* being in the library.

The valuable Linnaean Collection, works by Linnaeus, 1707-1778, or works based on his system of classification, contains several hundred volumes.

The post-Linnaean classics contain several "foundation" books: The first edition of a work by Spallanzani, 1785, which helped to establish the doctrine of biogenesis, Humboldt's *Essai sur la Géographie des Plantes,* 1805, which laid the foundation of plant geography, papers by Schleiden and by Schwann, 1839, on which was based the modern cell-theory, Hofmeister's work, 1851, on reproduction in lower plants, and Gregor Mendel's paper, 1866, describing his experiment on peas which founded the scientific study of heredity.

First editions of books by Charles Darwin comprise the Botanic Garden's collection of Darwiniana, including his *On The Origin of Species by Means of Natural Selection,* as well as all Darwin's works relating to plant life.

A gift of five hundred dollars was made by the Mrs. Field's Literary Club of Brooklyn, in 1939, for the purchase of rare books to constitute a memorial to Mrs. George White Field, the founder of the club. Purchases from this fund included works by Dillenius, 1741, Linnaeus, 1737, and Pasteur, 1862.

These rare volumes in the Botanic Garden library have great value, not only because they are collector's items but because they are original sources of information regarding the history and development of many phases of botany. It was a great pleasure to the Director to know that they were frequently consulted by students.

Two other collections reflect Dr. Gager's personal interest, one of autograph letters and the other of portraits of famous botanists, living and dead. The autographs include such well-known names as François André Michaux, Linnaeus, Robert Brown, Sir William Hooker, Thomas Huxley and John Torrey. A letter by Linnaeus, 1767, introducing a friend, and making a request for needed seeds, one by Charles Darwin, mentioning certain papers

FIG. 20. Alfred T. White Memorial, Unveiled June 7, 1923. (5633)

soon to be published, and one by Robert Brown to Sir Charles Lyell, geologist, and presented to the Garden by Lord Lyell and Lady Longman, the previous owners, are treasures of this group. The portraits are not only interesting, but of value when illustrations for botanical publications are needed. The interest which Dr. Gager had in the history of botany was a stimulus to the further collection of these items.

The library has been enriched not only by the gifts and donations already mentioned but also by the George C. Brackett Fund, J. W. Frothingham Bequest, John D. Rockefeller, Jr. Fund, and the Martha Woodward Stutzer Memorial Fund, the income of which is set aside for the library.

Since the library is specialized, those who use it generally have special problems, and their number is thus small if compared with more general public libraries. However, for the year 1943 the total number of persons recorded as using the library was over 3,200. Recent accessions are prominently displayed for those who wish to browse for a few minutes, while complete indices to volumes, pamphlets, and periodicals are available for those who must delve into an obscure research problem. Help is willingly given to the staff, to individual readers, and often to nationally known business firms in finding the answer to specialized botanical questions. These questions may be for information regarding a problem in horticulture, for early drawings of medicinal herbs, for photographs of plant parts, or for the most recent methods of plant propagation. Most projects planned by any department of the Garden require a certain amount of library research for their execution.

To have available for use by interested persons a vast collection of botanical information is a service which is enhanced only by special exhibits of material on a particular subject, which are presented with the thought and care necessary to arouse interest in that subject. Such exhibits by the library are regular features of Spring Inspection days. For the Twenty-fifth Anniversary Celebration of the Garden in 1935, an outstanding exhibit of books and manuscripts illustrating the history of botany was assembled. Among other exhibits were those for the Long Island Tercentenary Celebration in 1936, the meeting of the American Rose Society

and the Conference on Medicinal Herbs, both held at the Garden in 1939, and the 75th Anniversary Meeting of the Torrey Botanical Club in 1942, each containing books and letters of particular interest for the occasion.

Quite in keeping with Dr. Gager's interest in the scientific education of the children of the city, is the Children's Library, a collection of elementary books which is kept in an easily accessible location in the Boys' and Girls' Club Room. Many of the books have been given by the children themselves. Thus the Botanic Garden serves all ages, and offers a wealth of information on all phases of plant life, both theoretical and practical.

The Herbaria

In addition to the collection of books and periodicals in the library, and of labeled plants on the grounds and in the conservatories, the Botanic Garden also has another important reference collection—the dried plant specimens, carefully mounted and labeled, which are housed in fireproof steel cases. No botanic garden is complete without these preserved plants, for it is with their aid that identification and comparison of plants is accurately accomplished. They are essential to the proper installation and maintenance of plants in the gardens, and are frequently consulted by the staff members and visitors engaged in special investigations. Specimens are also loaned to botanists in other institutions for study, and similar courtesies of loan are extended to the investigators at the Botanic Garden.

The Herbarium of the higher plants was administered by the staff of the Department of Plants until 1934, when a separate Department was organized, and Dr. H. K. Svenson appointed Curator of the Herbarium. The care of the Herbarium of the lower plants was a part of the function of Dr. E. W. Olive, Curator of Public Instruction. Following the establishment of the Department of Pathology in January, 1921, the Fungous Herbarium has been administered by Dr. George M. Reed, Curator of Pathology.

The collection of flowering plants contains over 200,000 sheets, including a fine group of cultivated species and varieties. Specimens received from the Brooklyn Museum and from the Long Island Historical Society were the foundation for the collection, which has been constantly enriched by purchase, by exchange, and by gifts from universities and individuals.

Stress has been laid on the collection of plants of Long Island, that is, the local flora, and many specimens have been added to the herbarium during the past thirty years. One of the early American collections, 1815-1840, of which the Garden is fortunate in possessing several, was made by Mr. Stephen Calverley, a former Brooklyn resident.

A valuable collection of specimens from Manhattan, Long Island, and New Jersey, made by Professor John Torrey in 1816,

is in the herbarium. The Garden also possesses the herbarium of Wm. Cooper, one of Dr. Torrey's associates, collections made by C. F. Austin, H. B. Croom, M. C. Leavenworth, R. D. Nevins, and other well known botanists of the nineteenth century.

Important acquisitions to the phanerogamic herbarium were made by the purchase of the A. A. Heller herbarium, mostly from Western United States, and the Henry Dautun collection from New Jersey, France, and Spain. Outstanding among the gifts to the collection of higher plants were the specimens from the Whitney South Sea Island Expedition (1921-1927), presented to the Botanic Garden by the American Museum of Natural History. Expeditions by staff members of the Garden to Bolivia and Ecuador yielded most valuable additions to the herbarium of plants endemic to those particular regions.

In the cryptogamic group of algae, lichens, liverworts, mosses, and ferns, are some of the earliest collections which the Garden owns. In 1940, the Botanic Garden arranged with the American Fern Society to take over and administer its collection of ferns. The collection of fungi now totals more than 80,000 specimens. In the course of the years, many important exsiccati have been added, among them: E. Bartholomew, *North American Uredinales;* J. B. Ellis, *North American Fungi;* D. Griffiths, *West American Fungi;* Seymour & Earle, *Economic Fungi;* H. and P. Sydow, *Fungi exotici,* and *Mycotheca Germanica.* The most important addition was the purchase, in 1922, of the collection of Dr. Franz Bubák, for many years Director of the Botanical Garden, Tabor, Bohemia, which contained more than 33,000 specimens, and included about 500 new species of fungi described by Dr. Bubák.

Small collections of plant specimens for class use have also been secured, including flowering plants, ferns, and fungi. A special collection includes specimens of trees, shrubs, and herbaceous plants from the gardens and conservatories, which have been in constant use in connection with the establishment and maintenance of the living plant collections at the Garden.

Public Instruction

The second Curatorship established at the Garden was that of Public Instruction, and the appointment of Dr. E. W. Olive to develop this field took effect September 1, 1912. The scope of the activities of the Department was outlined in great detail in the *Record* for April, 1913. The work rapidly expanded, and Miss Ellen Eddy Shaw was added to the staff on September 1, 1913. On January 1, 1915, she was appointed Assistant Curator of Public Instruction, and one year later, Curator of Elementary Instruction, a separate Department being organized. Miss Shaw has developed this phase of the educational work into one of the outstanding features, which has brought world-wide fame to the Garden. An Assistant Curatorship of Elementary Instruction was established on January 1, 1916, when Miss Jean A. Cross was appointed, serving until December 31, 1919. Miss Elsie T. Hammond filled the position from September 1, 1921 until March 31, 1930, and was succeeded by Miss Margaret M. Dorward.

Dr. Olive resigned July 1, 1920. Since September 1, 1921, Dr. Arthur Harmount Graves has administered the activities of the Department of Public Instruction, developing and greatly expanding the work. In both Departments of Instruction, many individual instructors have had a prominent part in carrying on the classroom and laboratory studies, which deal with a wide range of botanical and horticultural subjects. Staff members of other departments have also aided in phases in which they were especially qualified.

Guidance of the educational program of the Botanic Garden for the past thirty years has been based on two fundamental principles. The first of these was the importance of public education and the dissemination of botanical knowledge. Upon one occasion Dr. Gager wrote: "Public education is the most important activity in which a botanic garden can engage . . . . Of what use to extend the borders of knowledge if the new knowledge is not made available to the public? Knowledge is power only when put into circulation, otherwise it is only potential energy, producing no results." "Botanical knowledge, like all knowledge, is primarily for the public; otherwise it has no justification. This thought

FIG. 21. Class from Kings County Hospital, enrolled in the Course for Student Nurses. Early blooming hardy Asters in foreground. November 4, 1931. (7322)

underlies our development of a strong program of public education for both adults and children."

The second principle was that of the value of obtaining botanical knowledge not from books alone, but from actual contact with living plants. The outdoor courses and those in which the students do actual gardening work, for which the Botanic Garden has become widely and favorably known, embody the idea of Agassiz, "Study nature, not books," which Dr. Gager was wont to modify to "Study nature *and* books."

"The educational program of the Brooklyn Botanic Garden includes anything scientific or educational based upon plant life." There are but few plans so wisely laid that they will remain the guiding principles for over thirty years of progress. Such, however, is the case with the tentative outline of educational activities of the Botanic Garden first presented in 1912 and, modified to meet present-day needs, is still being followed. The completeness of the plan is a credit to the far-sightedness of the Director.

Throughout the plan of the Garden runs the idea of education—of presenting information to the public in an acceptable and easily intelligible way. In the Systematic Section, the plants are arranged in a manner which illustrates their relation to each other and their place in the evolution of the plant world. The ornamental plantings are educational in their presentation of the principles of landscape design, of the cultivation and use of ornamental plants.

The plan of docentry by the Botanic Garden has greatly increased the value of the plantings and conservatories as educational features. Trips led by guides, whether for classes or for groups of interested individuals, result in a more complete understanding of the material presented. This is equally true of field trips held in connection with certain courses.

Special attention is called to certain features of the Garden when they are of particular interest by "story labels" placed nearby. These are marked "Exhibit of the Week" and have explanatory notes attached. They have been a very successful means of supplying botanical information.

Plants in the conservatories must also be well arranged and labeled. Descriptive labels were introduced to explain the origin,

FIG. 22. Class studying trees, November 6, 1931. (7308)

distribution, and economic uses of plants, or to present some biological principle such as evolution. By proper labeling and the service of instructors to explain special groups of plants, fundamental *concepts* of biology rather than the mere observation or *perception* of individual plants would be grasped by visitors.

Flower Days were initiated at the Garden in 1927. These have been held when the floral display of a particular group was at its best. The Days have served to give the members of the Garden an opportunity to become better acquainted with the plantings. Special Days have been held for the daffodils, Japanese Garden, cherry blossoms, lilacs, iris, waterlilies, and for other displays. Rose Garden Day and Chrysanthemum Day have become fixed features for June and November. A short talk is usually made by a member of the staff, or someone especially invited for the occasion, and this is followed by a tour of inspection of the flowers on the grounds. Flower Days, as far as we know, are original with the Brooklyn Botanic Garden.

A *Prospectus* of courses offered at the Botanic Garden is published each year. A great variety of topics is included; there are courses for the garden members and the general public. During the last few years these have been largely concerned with victory garden topics. Among the regular courses for members and the general public are those dealing with trees, shrubs, wild flowers, and ferns. Another group of courses is primarily intended for teachers, in which the elements of horticulture and gardening, greenhouse work, and plant culture, are taken up. Other courses are designed especially for the children and for special groups.

There is an agreement between New York University and the Brooklyn Botanic Garden which enables properly qualified graduate students to carry on independent investigations in botany at the Garden under the direction of members of the Garden staff. Opportunities for research are available in mycology, plant pathology, systematic botany, and morphology of the flowering plants.

A special course in medicinal plants for nurses, inaugurated in 1927, is unique. Two courses have been given by special request to employees of the Park Department. Following the war of 1917-1918, special training was given to soldiers in order to fit them for the particular vocation of gardening. The Garden is

FIG. 23. Classes from Public School 44, Staten Island, visiting the Botanic Garden for outdoor study of plants, May 6, 1937. (9607)

looking ahead and expects to render a similar service to those returning from the present war.

In every course, the attempt is made to obtain information directly from the living material wherever possible. "It cannot be over-emphasized," said Dr. Gager, "that the study of botany is the study of plants, and not the study of what somebody says about plants." One indication of the extent to which this is practiced at the Garden is the fact that in 1936 it was estimated that 43,000 plants were grown in the educational greenhouses by adults and children.

Although attendance records in no way show the value of the educational work of the Botanic Garden, they are an indication of the extent of the Garden's influence in the community. In 1940, about 1,700,000 persons visited the grounds, 53,000 of these coming over the week-end of May 11th to 13th to view the cherry blossoms and flowering crab apples. In the same year, 146,000 visited the conservatories, 108,400 attended classes and lectures, and the total adult registration for courses was 1,359. In 1934, the registered attendance on the grounds of the Botanic Garden as shown by the turnstiles at the entrance gates was equal to nearly one-half the population of Brooklyn, and the actual educational contacts reached a figure equal to more than one-third the Brooklyn population. In 1925, only a little over 500,000 persons visited the Garden (less than one-third as many as in 1940) and in 1922, total attendance at lectures and classes was only about 63,000 (a little more than half as many as in 1940).

Adult education is not limited to the scheduled courses at the Garden, but includes public lectures either at the Garden, at schools, or at meetings of teachers, parents, and garden clubs. In these ways the Garden reaches out to many people, giving information and offering the opportunity to come to the Garden for further study. These lectures are given by many members of the staff, and often cover a branch of applied botany such as horticulture or pathology.

Public demonstrations and exhibits have been part of the Botanic Garden's program for stimulating interest in plant life. There have been exhibits at schools, at the Garden, and at places such as the American Museum of Natural History, the International

Flower Shows, the World's Fairs, and elsewhere, which required the cooperative work of most of the staff members, the major part of the responsibility resting on the Horticulturist. These exhibits are designed primarily to be educational, and to interest the public in the opportunities for further botanical study offered by the Garden.

The Bureau of Information, begun in 1911, is merely the combined knowledge of the staff utilized to the greatest advantage of the public by accurate scientific replies to their questions. This is detailed work which occupies a great deal of time of the Departments of Instruction, the Curators of Plants, Herbaria, and Plant Pathology, the Horticulturist, the Librarian, and others.

Information regarding the Garden and botanical matters is offered the public through various channels, and in this publicity for the Garden, Dr. Gager was especially interested. He realized very keenly how important it is from many points of view that the general public be kept informed of the Garden's activities—lectures, courses, exhibits, flowers in bloom, new or rare plants, progress of research, etc. The method adopted of sending out news releases, every week or two, to the various metropolitan newspapers won his hearty approval. From time to time he himself suggested topics for these news articles, and was pleased when releases were reprinted in newspapers in other parts of the country —once even by a newspaper in India.

Radio programs presented by the staff members have also been a regular feature of the publicity program.

The Botanic Garden was a co-sponsor, with the Extension Service of the New Jersey State College of Agriculture, of the Radio Garden Club which gave broadcasts on ornamental horticulture once or twice a week over WOR from March, 1932 until July 1, 1941, when the Club's affiliation with WOR and the Mutual Network was severed. During this entire period a member of the staff served on the committee which formulated the programs and was responsible, with other members of the staff, for an average of about one broadcast per month.

Since 1933, weekly programs throughout the greater part of the year have been given over WNYC. Programs have also been given from time to time over other stations.

Elementary Instruction

"It was the wish of those who have been instrumental in securing the establishment of the Garden, that, in addition to research work, it should, to a greater degree that has hitherto been realized, or even attempted by botanical gardens, engage in the formal teaching of botany, and that it should become the means of encouraging and aiding the botanical work of local schools of all grades, elementary, secondary, and collegiate, both public and private." This wish has been ever kept in mind. A plan for education was worked out and elaborated as time went on. The most obvious beginning was to encourage classes of children to come to the Garden in school time with their teachers. The first high school class of seventeen girls arrived for instruction on October 6, 1913. From this time on, class after class of elementary, junior and senior high school students has visited the Botanic Garden. Colorful posters are sent to the schools each spring and fall, listing the lectures, demonstrations, and walks that may be arranged for. Lectures are planned to supplement the city and state syllabi of nature study and geography. Such talks as *Fall and Spring Wild Flowers; Bulbs: How to Plant and Care for Them; Economic Botany; Food Plants of the World; How to Start and Maintain Your Garden;* and many other subjects are given. These talks are usually illustrated by lantern slides and motion pictures. Experiments are set up to emphasize certain scientific truths.

The Garden has always encouraged small groups of visiting classes; it has been stated that we are working "educationally and not numerically," but of course there are various ways to reach larger numbers of children through special "days" like Rose Day and Lilac Day when many classes come by invitation, which emphasizes the importance of the occasion. To overcome the disadvantages of making contact with large numbers of children by lectures only, the plan was soon inaugurated of giving every pupil and teacher a syllabus containing important facts to serve as a basis for "follow-up" discussions in the classroom. A personal touch, characteristic of the relationship between the Botanic Garden and the schools, has been added by what is now a "tradition" of presenting to each visiting class some plants from the children's

FIG. 24. Children's Garden, midsummer, 1935. (8858)

greenhouses for classroom decoration and use. This little act of interest has established a very friendly relation between the children, teachers, and the Garden itself.

Dr. Gager, in analyzing his data on the botanic gardens of the world, stated that no other botanic garden had arranged so extensive a program for adults and children as had the Brooklyn Botanic Garden. While stress may be laid sometimes on the educational importance of small numbers, still the following figures show that through our various methods we have been able to care for a goodly number of children. In 1913, 544 children visited the Garden for class lectures and demonstration; in 1920, nearly 23,000; in 1925, over 58,000; and in 1940, the number was over 67,000, about the maximum possible with the limited number of hours in the day, and the current staff and classroom facilities. In thirty years approximately 17,000 teachers have brought to the Botanic Garden over 1,000,000 pupils. Surely this is serving the children of the City as Dr. Gager wished them served.

Entirely separate from the lectures given to children from the schools are the lectures and courses for which children register voluntarily and which have no direct connection with the school. Dr. Gager felt very strongly that: "A lecture may serve a useful purpose as a means of stimulating a spirit of inquiry and in giving information not readily accessible in books and periodicals, but a program of education which includes only lectures to more or less passive listeners violates the fundamental principles of teaching and learning." It must have been a great satisfaction to him that children of their own volition started the Saturday morning classes. In October, 1913, a little group from the neighborhood requested that they have a greenhouse class in the one greenhouse then set apart for children's work. This was the beginning of our Saturday morning work for children and from then on this work has been entirely voluntary, requested by the children themselves, and also paid for in part by them. A small fee is given by each child for his classwork. About seventy-five children entered the first Saturday morning groups; in 1943, the registration for these classes was 683 for the year. Because of the limited facilities, this will necessarily remain about the same yearly.

FIG. 25. Products of the Children's Garden: Main entrance to Children's Building, July 8, 1922. (4219)

These Saturday morning classes are arranged in series of fall, spring, and summer or outdoor garden courses. The children's year of Saturday work starts in the fall and interest at that time is centered about their greenhouse work. The instruction greenhouses, three in number, are unique in their plan and their set-up. The spring course includes nature study and preparation for outdoor gardens, with study of seed germination, sowing of seed, and making of garden plans. The summer work is in the outdoor garden.

An outgrowth of the garden work was the establishment of a summer school for teachers of gardening. This lasted for several years. Those taking the year's course formed themselves into an organization called the Garden Teachers Association. It has been a loyal and generous group contributing to funds for all appeals ever made by the Garden.

This Children's Garden project, a seasonal outgrowth of the Saturday morning classes, is an original pedagogical experiment which has been worked out with distinct success. In May, 1914, gardens in a temporary location were assigned to 125 out of the 180 children who applied. Today, in a permanent location in the southeast portion of the Garden, first utilized in 1916, there are 118 plots and two extensive flower borders. About 250 children register each spring for work in these plots.

A most useful and attractive center for the work is provided by the Garden House, which was erected with City funds in 1916, and the main room furnished by Mrs. James H. Post. The formal Shakespeare Garden, presented and endowed by Mr. and Mrs. Henry C. Folger, and other features in and around the House, are gifts of the children, teachers, parents, and friends who have taken a sincere interest or had an active share in the work.

The pattern, as laid down by the Curator of Elementary Instruction in accordance with the wishes of the Director, includes "self-discipline, knowledge at first hand, dignity of labor, financial support of our own work, generosity, ability to take a command and follow it, and ability to size up ourselves and our endeavors." The success of the gardens themselves, as measured by the crop, is relatively unimportant compared with the fulfillment of the above pattern. However, each year an attempt is made to show

FIG. 26. A school garden club, June, 1940. (10088)

the greatest possible crop obtainable on three-quarters of an acre of city land when the allotted garden space per individual is constantly worked.

An "Honor" day or Prize Day is held in October of each year when the awards are presented to those children who have covered the work. Four years ago Dr. Gager desired to give some prize to a boy and girl for outstanding work in the Children's Garden, and so the Director's Medal was decided upon and given for the first time in 1940. It was a great pleasure to him to do this and an equal pleasure for Mrs. Gager to continue the custom.

Prizes were originally awarded from a fund donated for the purpose by Mr. White, and the most important of these was the Alfred T. White Scholarship given for the first time in 1920, and continued through 1933.

Dr. Gager attended all Honor or Prize Days held for the children; their Christmas Party was not complete without him. The familiar sight of the Director and the smallest girl walking down the main aisle of the auditorium lingers with us. His talks to children carried the same grace and charm of language as did all his addresses.

Members of the Saturday morning classes call themselves the Boys and Girls Club. The Clubroom, where much of the indoor work centers, was made possible by a gift from Mrs. Helen Sherman Pratt, and opened in 1921. It offers to about 1,000 children yearly not only recreational and educational facilities, but an opportunity to assume responsibility and take pride in the Garden.

This short summary of the work gives little indication of the eager interest and spirit of the children who take part in this flexible program of study and pleasure carried out by the boys and girls of the Club. It is reassuring to know that the children's work at the Brooklyn Botanic Garden has been endowed to ensure its continuance. The fund, which now totals nearly $25,000, was obtained largely through the efforts of the Woman's Auxiliary of the Garden.

The project has not been limited to the gardens on Botanic Garden grounds. Through lectures, conferences, and correspondence, help has been given in establishing similar projects in other cities.

FIG. 27. Evolution of Plants Exhibit, Conservatory House No. 2. Center Bench: Liverworts and Mosses, Psilotum Group, Selaginella and Equisetum, Ferns, Cycads and Conifers. Right Bench: Monocotyledons by Families. Left Bench: Dicotyledons by Families. The Algae and Fungi are in the foreground not included in the photograph. January 26, 1940. (9913)

School gardens in Brooklyn have been encouraged, and a children's garden exhibit with about 2,000 exhibitors was held every year through 1925, with prizes awarded from funds donated for the purpose by Mr. White. These school exhibits were discontinued in 1925 because school and home gardening seemed to be well established. Beginning in 1930, a medal was awarded for several years to all schools having gardens up to a certain standard.

It is impossible for the schools to teach all their botany or nature study through lectures, visits, or demonstrations at the Garden, or by lectures in the classroom given by Garden instructors. Hence plant material is needed by the classroom teachers for instruction. The supply service, through which materials are given, lent, or sold to the school, greatly increases the opportunity of the Garden for school service. Assistance is given to nearly 7,000 teachers and over half a million children by means of living plants and plant parts and dried or preserved specimens for study. Every year one member of the staff presses, mounts, and labels hundreds of specimens of common flowers, weeds, and tree leaves and fruits for the schools.

In the spring of 1914, school principals were notified that the Brooklyn Botanic Garden would supply penny packets of seeds to pupils for backyard gardens. The request for 26,000 penny packets which was received, although pleasing to the Garden staff, presented a serious problem, since only 1,000 envelopes of seed had been prepared. It was, however, successfully handled, and over 5,000 Brooklyn children planted their own gardens at home or in school in 1914. In 1941, distribution of the seed packets passed well over the million mark.

The children's work has had wide educational publicity not only in this country but in lands across the sea. It was presented to educators and scholars at London University in 1931. Since the Garden was established, its lectures and classes have been attended by over 2,500,000 pupils and teachers. The Botanic Garden now has contacts with ninety-eight per cent of the elementary and all of the junior high schools in Brooklyn, as well as with many outside the Borough. Thus the correlation with the local schools functions through lectures and demonstrations to visiting classes and to classes at the schools; through the supply

of study material for classroom use; and through guidance in conferences with botany and nature study teachers; and is therefore fulfilling the original plans for this part of the educational program.

Dr. Gager's last publication was an account of the Brooklyn Botanic Garden and the schools (*Chronica Botanica* 7: 308-310. 1943). In this, he summarized the educational program for both adults and children, and mentioned that to him one of the most gratifying aspects of the work was the fact that many boys and girls carried on over a number of years their interest in the work at the Botanic Garden. From among them have emerged a few who have made botany or some of its branches their life work; but there are many more who have found the joy of broadened horizons and the pleasures of a lifetime hobby.

It always pleased Dr. Gager to see the children of eight (when they entered classes) and later to shake hands with many of these same children when they were leaving for college, realizing that they had spent eight or nine years of their lives under this roof, coming Saturday after Saturday in their own leisure time. This in itself is a monument to his far-sighted vision.

Research

According to Dr. Gager, "The outstanding perennial need of botanic gardens . . . is more knowledge. And the necessary new knowledge is, of course, to be obtained only by research."

"The really indispensable condition for progress is the spirit of inquiry," wrote Dr. Gager in one of his annual reports, and it is appropriate that we pause and evaluate this privilege in terms of past accomplishment at the Botanic Garden, in order to appreciate its worth, and foster its continuance wherever and whenever possible. "To the end of time, as we firmly believe, truth must be ascertained by the well-tested method of observation, inference and deductive verification," he stated before a group of scientists in 1917, and toward an appreciation of this belief by laymen he worked unceasingly during the entire period of his Directorship. He frequently requested funds to support research, for he felt that botanic gardens should not become mere "depositories and purveyors" of botanical knowledge; ". . . to a nation, research is a moral obligation," he once wrote, and added: "It is the very life blood of . . . botanic gardens if they are to be more than mere show places and retailers of second-hand information." He was fully aware, as most people are not, of the debt which all of us owe to scientific research, and he felt that it was the obligation of a botanic garden, which constantly used and benefited from the researches of others, to make its own original contributions to botanical knowledge. Research was one of the primary objects for which the Botanic Garden was founded and is one of its "largest opportunities and obligations as a botanic garden."

Dr. Gager favored the continuance of research in pure science, stating: "The surest way to make botany useful is to follow out a program of research in pure science; . . . That there can be no applied science unless there is first something to apply, is a truism." He once made the statement that "It would, no doubt, be misleading to say that the important thing about research is not the results, but the continuation of it; and yet there is an element of truth in that assertion." The emphasis has not been laid on the immediate results, but on a continuation of the spirit of inquiry. Although, according to him, "There is no place for the useless,

FIG. 28. War Gardens, 1918. Southern part of the Botanic Garden, taken from the Laboratory Building, June 19, 1918. (*2727*)

usefulness may not always be at once apparent," and thus if the results of research at the Botanic Garden have not always shown immediate practical applications, they were none the less commended by the Director. On the other hand, he was also of the opinion that the "practical ends of plant breeding, crop production, and disease control" should not "be minimized," and thus he always appreciated scientific observations and discoveries which had immediate practical applications. It was his wish that the results of research at the Garden would constitute a service to the public; "The Brooklyn Botanic Garden is the daily beneficiary of research done elsewhere; it is highly fitting that we should also be making contributions to our knowledge of plant life as a service not to the few, but to the general public."

All of the members of the staff were afforded the opportunity to carry on investigations in phases of botany and horticulture in which they were interested, insofar as their administrative and teaching duties permitted. The members of two Departments—Plant Breeding, established in 1913, and Pathology, in 1921—devoted practically all of their time to research. The results obtained have been published as four *Memoirs* of the Botanic Garden, and ninety-nine *Contributions,* the latter being papers first published in botanical journals and issued as reprints. A few of the *Contributions* were of a general or educational nature, but by far the larger number were accounts of intensive studies on specific botanical problems.

Because of the demands of administrative duties, Dr. Gager personally found but little time to carry on investigation. However, he continued his interest in the influence of radium rays on plant life and, in cooperation with Dr. A. F. Blakeslee, published a paper in 1927 on their experiments, in which ovaries of Jimson Weed were treated with radium emanations to induce mutations. The treatments were successful, and several mutant types, never before observed, were obtained. Two other papers, one published in 1916 and the other in 1936, reviewed the studies on the problem of the effect of radium rays on plant life.

During his first summer at the Botanic Garden, Dr. Gager accompanied Dr. N. L. Britton, Director-in-Chief of the New York Botanical Garden, and Mrs. Britton, on a trip to Western Cuba

for the purpose of collecting plants. Approximately 3,500 living or preserved specimens of plants were obtained, along with more than 120 photographs of the vegetation of Cuba. This was the first of many expeditions which have been made by members of the staff, and the observations and botanical information obtained have not only been published, but have also served as the basis of lectures for the diffusion of botanical knowledge.

Studies along ecological lines, dealing with the vegetation of the vicinity of New York, were undertaken by Mr. Norman Taylor, the Curator of Plants. Papers were published on the plant life of the pine barrens of New Jersey, the growth forms of the flora of the vicinity of New York, the significance of the White Cedar Swamp, Merrick, Long Island, and a longer *Memoir* on the vegetation of Montauk, Long Island. With Barrington Moore, a *Memoir* on the vegetation of Mount Desert Island, Maine, and its environment, was published.

Dr. Alfred Gundersen, Curator of Plants, has been especially interested in the classification of the flowering plants, and he has made extensive studies of the floral structure of members of several families with a view to determining their proper sequence in a system of classification. Botanists are fairly well agreed on the classification of most of the families of the dicotyledons, but the proper position in the scheme of classification of some of the smaller families is a matter of dispute. The studies on floral structure and placentation have been illustrated by excellent drawings made by Miss Maud H. Purdy, the Botanic Garden artist.

Dr. Gundersen has also been interested in the lilacs, and has assembled a collection of species and many varieties of great ornamental value to gardens.

Dr. Henry K. Svenson, Curator of the Herbarium, has published an exhaustive study on Elocharis, a world-wide genus of sedges, with most of its species in the New World. The publication included a résumé, indices, and maps, and illustrations of approximately 150 species distributed over the whole world. Another study has been made on the sedges of Panama.

In 1930, Dr. Svenson went to the Galapagos Islands and Cocos Island as botanist of the Astor expedition. Over 500 flowering plants and ferns were collected, chiefly on Indefatigable Island

in the Galapagos group, and Cocos Island, including over fifty species hitherto unreported from that region. Upon his return to Brooklyn, these plants were identified and, in 1933, the manuscript on the Galapagos Flora was completed, after he had made a trip to England to check the plants collected on expeditions of English botanists. In 1937, the study of the ferns of the Galapagos and Cocos Islands was published. A valuable opportunity came to him in 1941, as recipient of a John Simon Guggenheim Foundation Fellowship, to spend three months in Ecuador for the purpose of studying the geographical distribution of plants, and specifically to compare the flora of that part of the coast of South America with the flora of the Galapagos Islands. Plants were collected in Ecuador, and a comparative study is being made with those collected on the Galapagos Islands. Investigations on the flora of Tennessee have involved trips to Middle Tennessee to study, with the cooperation of Prof. Jesse M. Shaver of Nashville and the Tennessee Academy of Science, the flora of a section in which the wild life is doomed, due to industrialization following the Tennessee Valley Authority project. Over 8,000 plant specimens have been collected and these, together with numerous photographs, serve as the basis for a discussion of the Tennessee flora.

Dr. Edgar W. Olive, the first Curator of Public Instruction, was especially interested in the cytology of the rusts. With Prof. Whetzel of Cornell University, an expedition was made in 1916 to Puerto Rico to collect and study fungi. They found the climate and other conditions unusually favorable for the growth of parasitic fungi, and collections of more than 500 rusts and other parasites, many of them new to science, were made. Studies on the life history of some of the common rusts of Puerto Rico were carried out. Duplicate type specimens of fungi collected on this trip are now in the fungous herbarium of the Garden, as well as in the Department of Plant Pathology, Cornell University.

Dr. Arthur Harmount Graves, in addition to his activities as Curator of Public Instruction, with the assistance of members of his staff, has carried on investigations on the breeding of chestnuts for the purpose of obtaining trees which will be blight-resistant, combined with the upright, vigorous growth, which characterized the American chestnut and made it so excellent for timber. Native

FIG. 29. Victory Garden, showing beets, carrots, parsnips, and Swiss chard, June 23, 1943. (10711)

chestnuts which showed partial resistance to the bark blight were first successfully crossed in 1931 with resistant Japanese species, some of which were offered for the experiments by owners of private estates. The nuts so obtained were planted, and over a period of about fifteen years some 1,000 hybrids from such crosses have been grown, together with a collection of nearly all species of Castanea in the world. The seedling trees have been set out at the Brooklyn Botanic Garden, on private property at Hamden, Connecticut, and in other places which have been offered through the coöperation of Prof. Ralph C. Hawley of the Yale School of Forestry, Dr. D. F. Jones of the Connecticut Agricultural Experiment Station at New Haven, Dr. W. W. Herrick, Sharon, Conn., The White Foundation, Litchfield, Conn., The Avon Old Farms School, Avon, Conn., and Mr. Archer M. Huntington, Redding Ridge, Conn., and others.

In 1934, three of the Japanese-American hybrids bloomed, so that a new generation could then be started for the first time. Beginning in 1934, crosses of American and Chinese species were made and, more recently, crosses of Japanese-American hybrids with Chinese trees. Records are kept of the rate of growth and disease resistance for each individual and the tallest and most resistant trees are selected for further breeding. The aim at present is to develop a race of chestnut trees of the desired character which, by inter-pollination, will each year yield a quantity of nuts for reforestation.

In addition to breeding for a timber tree, the chestnut work has also for its purpose the breeding of a blight-resistant tree of robust growth and insect resistance, which bears nuts of a high quality, and which exhibits resistance to cold and drought.

Not only by experimental breeding, but also by making use of the native chestnut trees or their sprouts, still found growing here and there throughout the natural range of the chestnut, is there a possibility of discovering a blight-resistant tree. In response to requests, nuts have been received from many of the States within this range and, as a result, more than 300 native chestnut trees are now growing at Hamden.

The work has been conducted in coöperation with the Division of Forest Pathology, Bureau of Plant Industry, United States

FIG. 30. Exhibit of house plants, International Flower Show, March 13, 1939. (9782)

Department of Agriculture, and some of the costs have been defrayed by it. Special funds have been received from Mr. Godfrey L. Cabot of Boston, and also Grants-in-Aid from the American Academy of Arts and Science, the National Research Council, and the National Academy of Sciences. The North-Eastern Forest Experiment Station and the Connecticut Experiment Station at New Haven have coöperated by lending trained technical assistants during the flowering season for making pollinations.

The members of the Department of Plant Breeding, organized in September, 1913, with the appointment of Dr. Orland E. White, have devoted practically all of their time to investigation. The genetic studies on peas, which were the most extensive, were conducted in order to obtain information concerning the factors for characteristics such as height, color and shape of the pod, seed-coat color pattern, foliage and flower color and their interrelationship, as well as the influence of environmental differences on the expression of these factors, and the relation between these factors and the chromosomes. More than 200 varieties of peas, assembled in collaboration with the Bureau of Plant Industry, United States Department of Agriculture, were used in these extensive experiments with a view to discovering the manner of inheritance of all the character differences of peas and, in large measure, this has been accomplished.

The inheritance of endosperm color in maize, as well as various characters in castor beans, including stem color, bloom on the stems and fruit capsules, dehiscent and indehiscent seed pods, and seed coat colors, was investigated.

Another line of investigation has been concerned with fasciation phenomena in plants, the study of certain floral abnormalities in Nicotiana having been made. Two papers have been published dealing with the cold resistance of certain plants, one dealing with the geographical distribution of some herbaceous, perennial, and woody plant groups, and the other with the mutation, adaptation to temperature differences, and geographical distribution in plants.

Dr. White accompanied the Mulford Expedition for the Biological Exploration of the Amazon Valley, June 1, 1921 to April 14, 1922. The collections of the botanical members of the expedition numbered about 13,000 specimens, representing over 2,000

FIG. 31. Knot Gardens in the Herb Garden: Sweet Violet (*Viola odorata*), Lavender Cotton (*Santolina*), Germander (*Teucrium Chamaedrys*). Surrounding the Knots are Culinary and Medicinal Plants, segregated. September 12, 1941. (10317)

species, many of which were native economic plants. Seeds of about 200 species of herbs, trees, and shrubs, were collected.

The Curatorship of Plant Pathology was established on January 1, 1921, with the appointment of Dr. George M. Reed, by means of funds provided by Mr. Alfred T. White and two friends. The members of the Department have devoted their time almost exclusively to research. Specific problems have been investigated by assistants and graduate students, the results being embodied in theses for which they received advanced degrees at Columbia University or New York University.

A definite program for the investigation of disease resistance in plants was developed, including such topics as: the determination of the susceptibility of resistance of particular hosts, or varieties, to pathogens; the influence of environal factors upon the resistance and susceptibility of hosts; the existence of physiologic specialization of pathogens; and the inheritance of the disease-resistant quality.

For the study of disease resistance along the proposed lines, diseases of cereals have proved to be especially adapted, and most investigations have been made with the cereal smuts, since they were particularly interesting for these studies. The smut pathogen usually invades the host in the seedling stage, but shows no evidence of its presence until the heading, or flowering, time of the grain, weeks or even months later.

Physiologic specialization of plant pathogens has been known for a long time, but it was not until 1921 that this phenomenon was observed in the smuts. The first evidence of physiologic specialization in cereal smuts was obtained in studies made at the Botanic Garden, and five specialized races of covered smut of barley, two of the loose smut of oats and two of the covered smut, and ten races of the two species of covered smut of wheat were demonstrated in 1924-1927. Most attention has been paid to the oat smuts, and at the present time more than thirty races of loose smut and fourteen of covered smut are known to occur.

The characteristics of certain races of oat smuts were compared in their growth on artificial media in the laboratory, and new races have been originated by combining pure line cultures derived from two distinct races.

FIG. 32. Twenty-Fifth Anniversary Group at Brooklyn Botanic Garden, May 15, 1935. (8993)

Cytological studies on the relation of the oat plant to the loose smut of oats have been carried out. Along another line, the study of a possible correlation in the growth rates of oats and of the covered smut in regard to infection was made. The investigations with sorghum smuts necessitated a detailed study of the effect of nutrients, moisture, and other environal factors on the percentage of infection in susceptible varieties of sorghum, in order to find the best conditions for obtaining the highest percentage of infection, and environal factors which retarded seedling growth seemed to increase the percentage of infection; resistant varieties, however, showed no change in their response.

The discovery of varieties fully resistant or susceptible, the working out of environal factors necessary to obtain complete infection of all individuals of susceptible varieties, the knowledge of the existence of physiologic races and the necessity of taking them into account, have made it possible to make progress on the study of the genetics of resistance. Many crosses have been made between oat varieties differing in their behavior to specific races of smut, and the resistance or susceptibility of second, third, and later generations has been determined. In most cases the resistant quality is inherited on a simple one-factor basis. In others, however, the relation is much more complicated. Extensive studies on the inheritance of smut resistance in sorghums have also been carried out.

The investigations in pathology have been conducted in coöperation with the Division of Cereal Crops and Diseases, United States Department of Agriculture, investigators in some of the State Experiment Stations, and practical breeders for the improvement of cereal crops.

In connection with the cultivation of the iris collection at the Garden, serious damage caused by the iris thrips was noted. Extensive experiments were conducted in coöperation with the Bureau of Entomology and Plant Quarantine in Washington, and effective methods of control were discovered. The insect could be killed by dipping the rhizomes in hot water for a given length of time. More convenient methods, however, were found in the use of derris and nicotine sulphate sprays. It was further found that fumigation with methyl bromide could be safely used.

FIG. 33. Jenkins Fountain, Conservatory Plaza, September, 1930. (7030)

The work with the iris project led to hybridization between different varieties and species. A particularly valuable discovery was made in the hybridization of iris which had been collected in Southern United States, particularly in Louisiana. Previous to 1920, only a few species of iris were known in the South. Soon after 1920, however, a large number of different kinds of iris of the Fulva-Foliosa group were discovered by botanists and recorded as species new to science. Hybridization experiments carried on at the Botanic Garden between the two species—*Iris fulva* and *I. foliosa*—led to the production, in the second and later generations, of a wide range of forms differing in vegetative and flower characters. The conclusion has been reached that probably most of the so-called "new species" described from Louisiana are merely hybrids between two or three species, which have been known for a long time. An excellent set of watercolors of these has also been made by the artists already mentioned.

The first Resident Investigator at the Brooklyn Botanic Garden was Dr. Ralph E. Benedict, appointed in April, 1916. He was especially interested in the ferns, and undertook an investigation of the horticultural variations of the Boston fern, for which space was furnished in the Botanic Garden greenhouses. Grants from the American Association for the Advancement of Science made possible visits to the fern growers' establishments, most of the new types having appeared in greenhouses around the larger eastern cities. Through correspondence, every reported new type was obtained, from as far south as Louisiana and as far west as Colorado, and later from England and France, where similar series of new types had appeared. Later, the Garden's own series of spore-produced variations were developed from a single Boston fern type which was spore-fertile.

This study was begun at an opportune time, since the first interest in the new Boston fern sports had arisen in the late nineties with the appearance of the Boston fern itself near Cambridge, Mass., and two or three other new forms near Boston and New York. By 1915, the search for new variations was at its height, because of the possible commercial value of the new types.

The studies of the variations of the Boston fern, a most distinctive phenomenon in the field of genetics, have been published in several papers.

Dr. Ralph H. Cheney was appointed Resident Investigator for Economic Plants in July, 1931. His research program was developed around two major topics—the beverage plants, and the medicinal plants of the world. Taxonomic and geographic studies were made, followed by experimental investigations to extend the knowledge of the effects of the beverage and medicinal extracts, in comparison with the effects of the purified active principles derived from them, upon the normal physiological processes in man. Chief attention was devoted to the caffeine-yielding plants, and the results have been published in domestic and foreign scientific journals. After the beginning of the present war, a survey of the availability of essential drug and insecticide plants in the nurseries of the northeastern United States was completed, as a unit in the service record of the Botanic Garden to the national emergency.

Coöperation with Other Organizations

The Botanic Garden has coöperated with many organizations in carrying on activities in botany and horticulture. The Garden is one of the three divisions of the Brooklyn Institute of Arts and Sciences, and has assisted the Department of Botany of the Institute in the arrangement of meetings, lectures, and demonstrations. The Garden has also coöperated with the Brooklyn Museum in furnishing material for various types of exhibits.

Coöperation with the Board of Education and the New York public schools included work by the Department of Elementary Instruction of the Garden and the Director of the City School Garden on various courses and projects. In addition, a representative of the Botanic Garden has served on committees of the Board of Education in planning courses in botany and nature study. "In service credit" for courses offered at the Garden is given by the Board.

Dr. Gager took a prominent part in the activities of the Horticultural Society of New York, serving as Vice Chairman of the Board of Directors for several years. Frequent exhibits have been made by the Garden at the Horticultural Society's shows, a gold medal being awarded for an exhibit of ornamental fruits at the Victory Garden Harvest Show (1942), and a silver medal for an exhibit of cereals, featuring hybrid corn (1944).

The Garden has participated in the International Flower Shows since 1918, and for many years Dr. Gager was a member of the Flower Show Committee. For its exhibits, which have been under the direction of the Horticulturist, Mr. Montague Free, the Botanic Garden has received numerous awards, including gold medals for the demonstration of plant propagation (1933), methods of pruning (1934), plants for rock gardens (1936), exhibit of xerophytes (1937), ivy garden of seventy-six species and forms (1941), for which it also received the Bulkley Gold Medal of the Garden Club of America, and methods of graftage (1942). Silver medals were received for a collection of crocus species (1933), an exhibit of garden operations (1935), a knot garden with herbs (1938), and an exhibit of carnivorous plants (1940).

FIG. 34. Boulder Bridge—one use of the glacial boulders, September 12, 1929. (6811)

The Garden won its first gold medal in 1921, by an exhibit of ferns at the Massachusetts Horticultural Society Show at Boston.

Dr. Gager took an active part in organizing Hortus, Inc., which sponsored "Gardens on Parade" at the World's Fair in New York in 1939 and 1940. Herb and knot gardens were arranged in a section of the grounds, and a large number of Japanese iris were also exhibited in both years.

In 1920, the American Iris Society arranged for the establishment of a test garden for Japanese varieties of iris. A very complete collection of varieties and species has been assembled. Not only have the American nurserymen contributed generously, but many varieties have been imported from abroad, especially from growers in England and France, as well as Japan, the native home of the Japanese group. The studies involved the methods of culture, the correct names of varieties, and possible methods of classification for easy identification. A valuable contribution to the records of the Japanese iris is the fine collection of watercolors made by Miss Maud H. Purdy and Miss Louise B. Mansfield. A selection of these was exhibited at the Century of Progress Exposition in Chicago in 1933, and the New York World's Fair in 1939 and 1940.

In 1930, the Garden entered into an arrangement with the American Fern Society which provided for the care and administration of the society's library; in 1940, the fern herbarium of this society was deposited with the Garden.

The Garden has offered opportunities for advanced research in botany to students who wished to utilize its facilities. Many young men and women have carried on investigations in the Garden's laboratories. The results have been accepted as theses for advanced degrees at both Columbia University and New York University and, during the years, six young people have utilized the facilities of the Garden for their research, and obtained the doctor's degree.

In connection with the research work, mention has been made of the coöperation with the United States Department of Agriculture in the study of cereal diseases, breeding for chestnut blight resistance, and the control of iris diseases and pests. During the first world war, Dr. Olive carried on a survey of fruit diseases in

FIG. 35. The Richard Young Gate, May 12, 1937. (9434)

the Hudson River Valley region. Studies of onion smut conditions in the Wallkill Valley of Orange County, and a cereal disease survey through the Hudson River Valley were also made. Later, a new wheat disease caused by nematodes was investigated in West Virginia.

Dr. Orland E. White was granted a leave of absence for several months in 1918 in order to collaborate with the National Research Council in the study of problems connected with the growth and utilization of the castor bean, which had become of great importance for the purpose of securing oil for use as a lubricant for airplanes. Castor bean plantings in several Southern states were visited and studies were carried out on the value of different varieties for the production of oil.

In 1917-1918, a model vegetable garden was exhibited on the grounds of the Botanic Garden, and many plots were devoted to "win-the-war gardens." Members of the Garden staff worked with the Mayor's Committee on Food Supply. Leaflets were prepared, lectures were given to various groups, and gardens in Brooklyn were inspected. In the present war, a similar program of public education on vegetable gardening has been conducted through courses, lectures, demonstrations, leaflets, newspaper articles, and radio broadcasts. One member of the staff has devoted a large amount of time with the Greater New York Victory Garden Council.

Arrangements were made between the Botanical Society of America and the Botanic Garden for the publication of the *American Journal of Botany*. The first volume of the journal appeared in 1914, twenty-two volumes being published through the cooperation of the Society and the Garden. In 1920, a similar arrangement was made with the Ecological Society of America for publishing *Ecology* and, in 1921, with the Editorial Board of *Genetics* for the publication of its journal. Dr. Gager acted as Business Manager for all three journals and, since they are widely circulated in foreign countries, this has been one of the important ways in which the Garden has aided in the advancement of botany.

FIG. 36. Osborne Memorial, Horticultural Section. View looking South. June 1, 1940. (10107)

Endowments and Gifts

By the terms of the original agreement between the City of New York and the Brooklyn Institute of Arts and Sciences, the former has made annual appropriations for the maintenance of the Botanic Garden, and from time to time special funds for permanent improvements have been supplied. In its relation to the City, the Garden has been affiliated with the Park Department, and the Park Commissioners have given effective support.

The Botanic Garden, however, would not have accomplished its purposes if it had not been aided by large gifts from private individuals. In order to establish the Garden, an endowment fund of $50,000 was offered by friends of the Institute, through Mr. Alfred T. White, in December, 1906. As the years passed by, many contributions for specific endowments have been received, and special funds for particular features also have been given.

At present, there are twenty-two distinct endowment funds, the principal of which amounts to a total of about $1,389,325. Among the larger endowments may be mentioned the Alfred T. White Fund (1921), the Robert B. Woodward Bequest (1921), the Brooklyn Institute Centennial Fund (1924), the Henry W. Healy Trust (1930), the F. E. W. Fund (1937), and the Ellen Eddy Shaw Fund (1939). In 1926, Mr. John D. Rockefeller, Jr. offered $250,000, provided that an equal sum be obtained from other sources before December of that year. Under the chairmanship of Mr. Alexander M. White, the citizens of Brooklyn contributed a total of $256,000, thus fulfilling the terms.

A plan for providing for additional permanent funds was the proposal of Dr. Gager that twenty per cent of the annual income from funds restricted by terms of gifts and otherwise to the educational and scientific work of the Botanic Garden be set aside each year, and the interest compounded. The result of this proposal, which was adopted as of January 1, 1921, has been the building up of the Endowment Increment Fund, which has added more than $150,000 to the permanent funds.

Financial contributions have been secured from many different sources and utilized for specific purposes. Special mention should

be made of the research funds. The contribution of $50,000 by Mr. Alfred T. White and friends resulted in the establishment of the Curatorship of Plant Pathology, in 1921, and annually since then additional amounts have been provided for carrying on this phase of the Garden's activities. For special research purposes, the American Academy of Arts and Sciences, The National Research Council, The American Philosophical Society, The American Iris Society, as well as many individuals, have contributed.

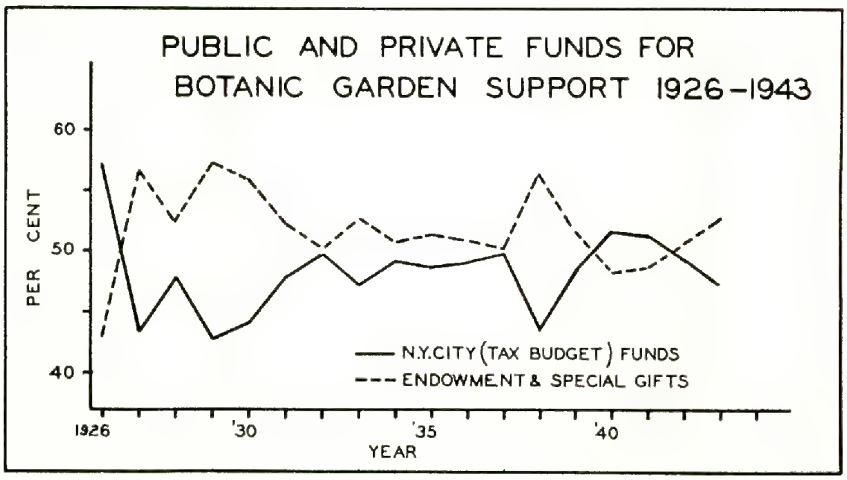

CHART 1. Comparison of Botanic Garden expenditures from public and private sources.

In the course of the years, many gifts have been received. In 1915, Mr. Alfred T. White provided for the construction of the Japanese Garden, and anonymous friends have contributed annually for its upkeep. Mr. White also donated $100,000 for the completion of the Laboratory Building and conservatories in 1916. The construction of the Rose Garden was made possible by contributions of Mr. and Mrs. Walter V. Cranford, and later, the Rose Arc was presented by Mrs. Cranford in memory of her husband. Funds for providing bridges were made available by Mrs. John Hills and Mr. Alfred W. Jenkins; the gate on Flatbush Avenue was presented by Hon. Richard Young in 1929; a bequest of Mr. Sidney Maddock provided funds for the two gates on Washington Avenue in 1937 and 1938. The Osborne Memorial in the Horticultural Section was given by Mrs. Dean C. Osborne in 1938 in memory of her husband.

Other significant gifts are the bronze statue "Roses of Yesterday" for the Rose Garden, by Mrs. Walter V. Cranford, in 1937, and the armillary sphere and fountain on the conservatory plaza by Mr. Alfred W. Jenkins, in 1930 and 1933. Mrs. Glentworth R. Butler secured the funds for drinking fountains. Several donors contributed the garden seats, including Mr. and Mrs. Edward C.

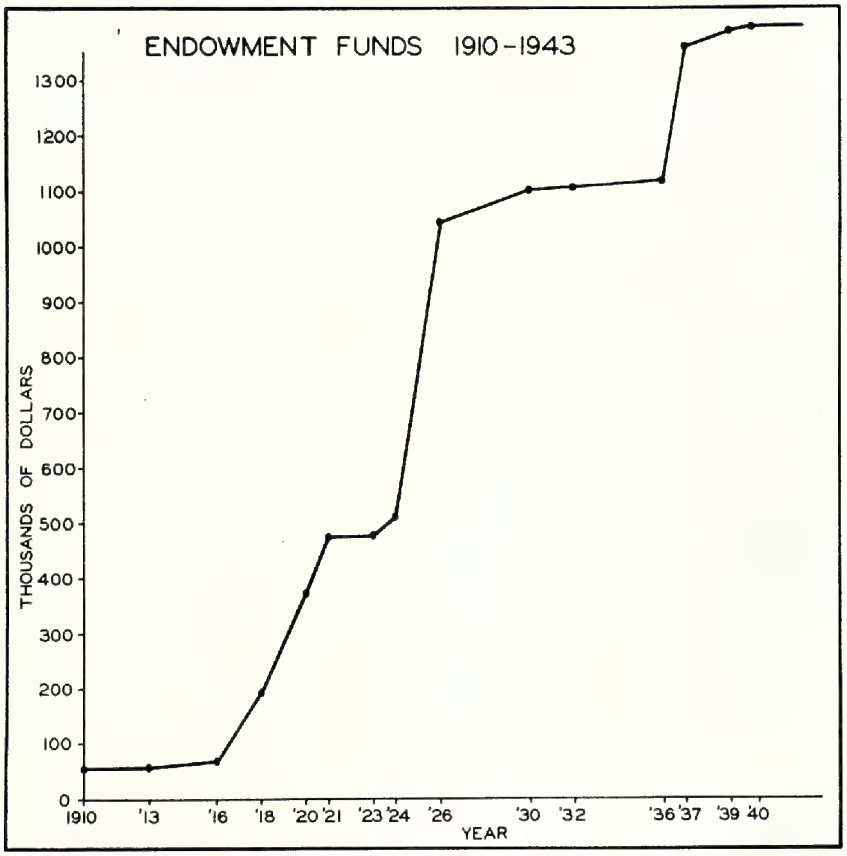

CHART 2. Growth of Botanic Garden permanent resources for scientific and educational purposes.

Blum, Dr. and Mrs. Charles G. Purdy, Mr. Alfred W. Jenkins, and the Garden Teachers Association. The tablets for the glacial boulders were provided by Mr. Edward C. Blum and the Boys and Girls Club.

The National Society of the Daughters of the American Revolution, the Colonial Daughters of the Seventeenth Century, the Brooklyn Civic Council, the Faculty and Students of the Girls

Commercial High School, the Girl Scouts of Flatbush, and others, have endowed trees in the Garden. Mrs. Edward C. Blum made a contribution for a planting of Forsythia.

The Botanic Garden has been fortunate in having the support of many friends. As one of the three divisions of the Institute of Arts and Sciences, it has been under the administration of the

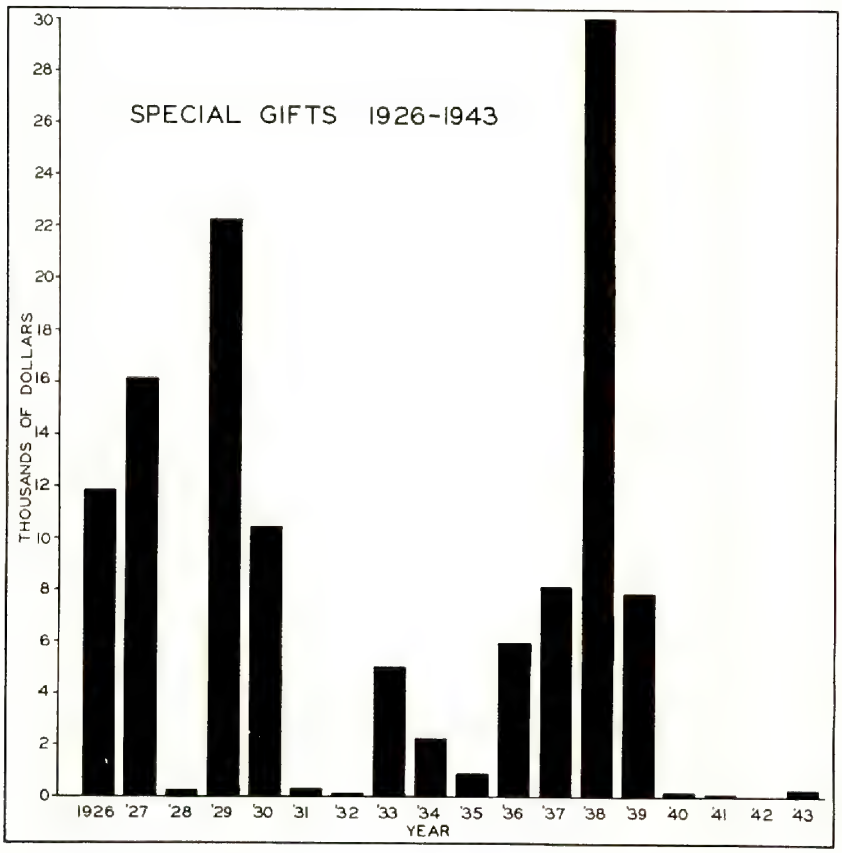

CHART 3. Gifts to the Botanic Garden for special purposes—such as the Maddox and Young entrance gates, the Jenkins and Hills bridges, the Osborne Memorial, the Cranford Rose Garden.

Board of Trustees of the Institute. Mr. A. Augustus Healy was President of the Board of Trustees from 1895 until 1920, during the period in which efforts were made to establish a garden, and the first ten years of its development. Mr. Frank L. Babbott was President from 1920 to 1928, and he was followed by Mr. Edward

C. Blum, who served as President from 1929 to 1938 and, since then, as Chairman of the Board. From 1939 to 1942 Dr. James G. McDonald was President of the Institute, being succeeded by Mr. Adrian Van Sinderen.

The Botanic Garden Governing Committee of the Board of Trustees is the administrative group concerned with the management of the Garden, and a great debt is owed to the men and women who have served as members of this Committee. Mr. Lowell M. Palmer was appointed Chairman of the Committee when it was first organized in 1897. He was succeeded by Mr. Alfred T. White in 1905, who continued to serve until his death in January, 1921. Mr. White was followed by Mr. Frank Bailey (1921-1926). Miss Hilda Loines has been Chairman of the Committee since 1926, and has taken a large part in the Garden's development.

In 1915, Dr. Gager suggested the organization of a Woman's Auxiliary, which might aid in the development of the Garden and help to articulate it with the local public. The Auxiliary was formed at the home of Mrs. Alfred T. White on March 8, 1917, and has rendered valuable service in many ways. Mrs. H. B. Spelman was the first President and, in the course of the years, the following women have served as President: Miss Hilda Loines (1921-1925), Mrs. Glentworth R. Butler (1926-1932, Honorary President in 1932-1942), Mrs. Charles E. Perkins (1932-1934), Mrs. Irving L. Cabot (1935-1936), Mrs. Henry J. Davenport (1937-1940), and Miss Jessie H. Righter (1941-).

The Woman's Auxiliary has been an integral part of the Garden, and has been effective in raising funds, canvassing for increased membership in the Garden, and has contributed many valuable gifts. Funds were provided for the publication of *Memoir* 4 of the Garden series which contained the papers presented at the Twenty-fifth Anniversary Exercises. A contribution was made for the publication of a colored plate illustrating iris hybrids. The Plaza planting of magnolias, some of the shrubs and trees for the Horticultural Section, and the new planting of Japanese flowering cherries on the Esplanade, were furnished by this organization.

The success of the Annual Spring Inspection, held in May, has depended in large part on the coöperation of the Woman's Aux-

iliary. The members of this organization have also acted as hostesses on Flower Days, such as Rose Garden Day and Chrysanthemum Day.

In his address given at Swarthmore College on May 23, 1942, on the presentation of the 1941 Arthur Hoyt Scott Garden and Horticultural Award of a Gold Medal, Dr. Gager stated: "If anything has been accomplished at the Brooklyn Botanic Garden during the past thirty-two years worthy of such recognition as this, it is due to the support and encouragement of generous and philanthropic trustees and other citizens and to the loyal coöperation of an able staff, which has made possible the development of an institution after a pattern which, in its entirety, is essentially new for a botanic garden."

Personal Activities, Honors, and Achievements of the Director

A complete list of the published writings of Dr. Gager would contain more than three hundred titles. Some of these were technical contributions to botany; others were concerned with botanical education; and a very large number were short articles dealing with the Botanic Garden, and book reviews.

Dr. Gager edited the publication of thirty-two annual volumes of the *Brooklyn Botanic Garden Record,* which was founded in 1912. One number of each volume was devoted to the Annual Report of the Garden's activities. Other numbers included the *Prospectus* of courses for the educational work, the publication of special features of the Garden, including the *Guides* to *The Japanese Garden, Rock Garden, The Story of Our Boulders, The Story of Fossil Plants, The Rose Garden, Local Flora, Herb Garden,* and the *Medicinal Plant Garden.* In the Annual Reports of the Director, Dr. Gager reviewed the activities and accomplishments of the Garden. Some of the special numbers were written by him, or with his active coöperation.

In 1908, Dr. Gager published an extensive paper on the effect of radium rays on plants. His interest in the evolution of plants led him to translate and publish, in 1910, *Intracellular Pangenesis,* by Hugo deVries. In 1916, he published his first text book *Fundamentals of Botany,* and in 1926, another text, *General Botany with Special Reference to its Economic Aspects.*

For many years Dr. Gager was engaged in compiling data for the publication of *Botanic Gardens of the World: Materials for a History.* The first edition appeared in 1937 and a second in 1938, in the Botanic Garden *Record.* Data concerning more than 550 botanic gardens in eighty countries were included. Dr. Gager had visited some of these gardens in 1927, when he made an inspection of gardens and botanical institutions in seven countries in Europe. Again, in 1930, when he attended the Ninth International Horticultural Congress in London, and the Fifth International Botanical Congress in Cambridge, he spent some time visiting European botanical gardens.

On many occasions, Dr. Gager was called upon for public addresses. In these, he presented botanical and horticultural information in an interesting way. Some of the most important ones include that on *Botany*, a non-technical address before the students and faculty of the University of Missouri, in 1909; the address of the retiring Vice President and Chairman of Section G, Botany, of the American Association for the Advancement of Science, *The Near Future of Botany in America*, on December 29, 1917; the address at the dedication of the Wellesley botany building, November 1927, *Wellesley College, and the Development of Botanical Education in America;* The Founder's Day address, Swarthmore College, Swarthmore, Pa., *Botanic Gardens in Science and Education*, on October 31, 1936; the address of the retiring President of the Botanical Society of America at Indianapolis, December 29, 1937, on *Pandemic Botany*. His last important address was delivered at Swarthmore College, May 23, 1942, on *Theatres, Gardens, and Horticulture*, at the time of his acceptance of the Arthur Hoyt Scott Horticultural Award and the dedication of the new open-air theatre of the College.

Dr. Gager's breadth of interest was shown by his membership and activities in many botanical, horticultural, and other organizations. He was a member of the following:

American Association for the Advancement of Science;
American Association of Botanic Gardens and Arboretums (Member of the Board of Directors, 1940-);
American Society of Biological Chemists;
American Society of Naturalists;
Botanical Society of America (President 1936);
Fairchild Connecticut Garden (Member of the Board of Trustees and President pro tempore);
Horticultural Society of New York (Member of the Board of Directors, 1928-; Vice-Chairman of the Board, 1938-);
New York Academy of Sciences;
Park Association of New York City;
Society of Experimental Biology and Medicine;
Société Linnéene de Lyon;
Svenska Linné-Sällskapet;

Torrey Botanical Club (President 1942);
Adelphi College (Trustee, 1932-1940);
Brooklyn Civic Council;
Century Association;
Committee of One Hundred for the Completion of the Brooklyn Central Library;
National Institute of Social Sciences (Vice President, 1928-1931; President, 1932-1935, and Vice President, 1935-);
New York City Committee for Public Education;
Twentieth Century Club (President 1933-1935);
Rembrandt Club.

Dr. Gager served on many botanical and horticultural committees, among others, the following:

American Institute of Park Executives to consider affiliation of botanic gardens and arboretums;
Botanical Exhibits for the World's Fair (A Century of Progress), Chicago, 1933;
Education and public relations of Planning Committee on United States Botanic Gardens (Chairman 1934-);
Merchants' Association of New York City (1922-; Chairman 1933-);
Sub-committee on Organization of Editors of Committee on Research Publications, National Research Council (1934);
Plant Quarantines and their Administration;
Sub-committee on Scope and Function of Planning Committee on United States Botanic Gardens (1934);
Sub-committee on Survey of Committee on Effects of Radiation on Living Organisms, National Research Council (1931–1935);
Vice-President of Hortus, Inc., for the New York World's Fair.

Dr. Gager served as Vice President and Chairman of Section G, American Association for the Advancement of Science, in 1917; as President of the Botanical Society of America in 1936; as Vice President of the Torrey Botanical Club in 1917–1931, and President in 1942. He was made an honorary member of the Royal Agricultural and Horticultural Society, India, the School Garden

Association of America, and the Royal New Zealand Institute of Horticulture. The Pennsylvania Horticultural Society made him an honorary life member in 1934. In 1920, the honorary degree of Doctor of Science was conferred on him by Syracuse University, from which he had graduated twenty-five years before. In 1921, the honorary degree of Doctor of Pedagogy was conferred by the New York State College for Teachers.

An honor which Dr. Gager greatly appreciated was the Arthur Hoyt Scott Garden and Horticultural Award of a gold medal and cash for outstanding achievement in the field of horticulture and botany, in 1941.

On the twelfth day of June, 1943, Dr. Gager was at the Brooklyn Botanic Garden for the last time. In July, 1910, when he first saw the original area of forty acres, then known as Institute Park, substantial border mounds had been constructed along Washington and Flatbush Avenues and planted with miscellaneous trees and shrubs. The land had been graded to provide a diversified topography, with a lake and hills, and walks had been laid out. "Such was our inheritance," he wrote.

In contrast, a third of a century later, the Botanic Garden was well established. The grounds were planted with many herbs, shrubs, and trees, arranged in a manner to show their relationship. Many special features had been provided—the Japanese Garden, the Rose Garden, the Local Flora, flowering cherries and crab apples, daffodils, waterlilies, the Children's Gardens, and "my brook," running through the grounds from the lake. The Laboratory Building, with its classrooms, laboratories, library, and administrative offices, provided visible evidence of the accomplishment in the realm of education and research. The Garden had a host of friends whose interest and material support made possible the realization of Dr. Gager's vision of a world-renowned institution of botanical teaching and research, placed in a setting of great beauty. He might well have said "This is our bequest."

If, in reviewing this record of accomplishments at the Brooklyn Botanic Garden, we have also kept in mind, as Dr. Gager admonished us to do in making a review of past accomplishments, that

"the present holds the promise of the future," then this record will have its greatest value not only as a memorial to the man whose continuity of effort created the Brooklyn Botanic Garden, but also as a stimulus to those who, by their courage and vision, will carry on the ideals for which he labored, and continue to build for permanence, just as he would have wished it.

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ACKNOWLEDGMENT

This account has been prepared by the Botanic Garden staff, with the assistance of Marie E. Conklin.

The Thirtieth Annual Spring Inspection
Tuesday, May 9, 1944

The program was planned in honor of Dr. C. Stuart Gager, Director, July 1, 1910-August 9, 1943. It included an assembly in the Auditorium, a tour of inspection of the grounds to view interesting features of the Garden, and an exhibit, displayed in the rotunda, corridors, and exhibit room, of enlarged photographs of the Garden illustrating its development.

Miss Hilda Loines, Chairman of the Governing Committee, presided at the meeting in the Auditorium, and introduced Mr. John C. Wister as follows:

"In welcoming you this afternoon it seems strange not to have with us Dr. Gager, who was always the centre of these occasions, and it is still stranger to realize that before Dr. Gager came to Brooklyn there was no Brooklyn Botanic Garden here. It was he who developed an unpromising area consisting chiefly of waste-land into this place of beauty which we are all enjoying today. But in the development of the Brooklyn Botanic Garden, Dr. Gager's service to science and education was no less notable, and I should like to give you an estimate of his work in this field by the noted Russian botanist, Dr. N. W. Timofeeff-Ressovsky, who came to this country for the Genetics Congress of 1932. After a visit to the Brooklyn Botanic Garden, he wrote as follows:

" 'The Brooklyn Botanic Garden is a very young one; and it is astonishing to realize in how short a time Dr. Gager has succeeded in organizing such a rich and well-planned scientific and public institution. In many respects the best European botanical gardens are far behind the Brooklyn Botanic Garden, although they are much older, and have a long scientific and organizational tradition and connections with celebrated old universities and scientific institutions.

" 'The second point concerns the research work that Dr. Gager and Dr. Reed have organized at the Brooklyn Botanic Garden. In most cases research is the weakest aspect of botanical gardens. In cases where some connection with science exists, it is usually only a connection with systematics. Very seldom does one see

experimental research done in botanical gardens, in spite of the fact that they must offer especially good conditions and possibilities for this kind of modern scientific work. Therefore I consider it particularly significant that Dr. Gager has emphasized the importance of experimental scientific work and has found some financial support for this work, that he has published (in excellent editions) the results of the work, and that in addition he has provided opportunities for young scientists from the New York universities to do their experimental work on the research grounds of his Garden.

" 'The last point, and perhaps the most impressive, is the organization of the pedagogical department of the Brooklyn Botanic Garden. I think that in this respect the Garden surely occupies one of the first places, if not the first, in the whole world. Especially well planned and well organized are the rooms, greenhouses and gardens for children of different ages, and the collections of lantern slides, accompanied by short abstracts of papers to be read by teachers.'

"It was the happy suggestion of Dr. Reed that the Spring Inspection this year be made the occasion to honor the achievements of Dr. Gager, and we are especially fortunate in having with us as our speaker, Mr. John C. Wister, Director of the Arthur Hoyt Scott Horticultural Foundation, who knew Dr. Gager intimately over a long period of years, and who is eminently qualified to speak of his life and work."

Address of Appreciation

BY

Mr. John C. Wister

It is quite fitting that the Spring Inspection, which is the most important of the meetings during the year, should be devoted in part to a tribute to Dr. Gager and to his work, not only in building up the Brooklyn Botanic Garden but in botany and horticulture in general.

Naturally I feel greatly honored to have been asked to speak here today. I first knew Dr. Gager about 1920 and was quickly impressed by the extraordinary breadth of his interests and his deep knowledge of all subjects relating to botany and the growing of plants. I may add something else that will not surprise any of you because I am sure it has happened to you too:—I grew very fond of him and came to value him not merely as a learned man but as a true friend. In the past twenty-four years I have come many times to this garden on many different errands, but hardly ever came without seeing him and without getting from him both help and inspiration.

Many of you know that in the late 90's and early 1900's there arose in Brooklyn a desire for a botanic garden. In time this desire grew into a definite movement which reached fruition in 1910, largely through the active support of Mr. Alfred T. White.

The site chosen for the garden was a thirty-nine acre tract of mostly undeveloped land on part of which the Park Department burned trash and rubbish. Eleven additional acres were acquired later.

Dr. Gager had been, among other things, Professor of Botany at the University of Missouri, and Director of the Laboratories of the New York Botanical Garden, where he had instituted one of the earliest investigations of the effect of radium on plants. In both positions he had made a good impression. Even at an early age his great scientific knowledge made it possible for him to speak to scholars. He had with that the ability to make public addresses which interested his audiences, which frequently, was not the case with many botanists. The unfortunate inability of many scientific

men to make the general public understand what they were doing, has held back the appreciation of botany and other sciences for a long time in this country. Dr. Gager helped bring happier co-operation between the scientific botanist, the skillful horticulturist, and the large public that cares for gardening only in a very mild way.

Dr. Gager came to Brooklyn on July 1, 1910. First he had a small office down town. Later he moved to the Brooklyn Museum, for the Botanic Garden was chartered as a subdivision of the Brooklyn Institute of Arts and Sciences. The development work in the garden began in April, 1911. The public was admitted in May 1911 when there was little to be seen in the way of accomplishment except a few paths and trees. In September, 1913, the first part of this building was opened for use and Dr. Gager and staff moved in, although the building and conservatories were not completed until 1917.

I give this brief introduction as a background against which to sketch the work of Dr. Gager, which I should like to consider under four different headings.

1. Development of the Garden.
2. Popular Education.
3. The Promotion of Research.
4. Coöperation with Botanical and Horticultural Organizations.

(1) *Development of the Garden.* Many of us who love trees, shrubs, and flowers, wish to have them displayed in crowded cities for the inspiration and pleasure of the public. It is quite natural that, to us, Dr. Gager's work in building up, on a piece of undeveloped land, this beautiful 50 acre garden, should come first. He, of course, had the benefit of the experience that had been gained in the pioneer gardens of the country. It was early evident, however, that he brought here a new point of view. This was the desire to make the gardens popular with the general public and to have the plants seen by many thousands of people rather than by just a handful of students.

Most of the botanical gardens in the old world were very small. They were primarily for the advanced student. The plants of the various botanical families were crowded closely together so that

they might be studied together. The beauty of plants did not seem important to the directors.

Professor Sargent was perhaps the first to develop a public garden along natural lines for beauty as well as study, but even he paid scant attention to plants for the enjoyment of the general public. He was bringing together every woody plant that would stand the New England climate. It was enough for his purpose that one specimen of a species was present. Dr. Gager understood, more than any botanist before him, the need of interesting the general public in botany. He drew attention to his idea that if the sciences are to advance it can only be through popular support. Popular support in botany he believed could best come because people enjoyed visiting the garden and seeing the beautiful plants well grown, in well arranged groups.

He was one of the first to give a section of a public garden to the local flora. He planted in this area as many as possible of the plants of Long Island and nearby mainland. When the greenhouses were built he took care to have some of them filled with beautiful plants for the public to enjoy, in addition to those houses which were used for research. Through the years he developed the different plantations which now form such an important part of the garden: the flowering cherry, the crab apple and lilac collections; the water gardens, the Japanese garden, the rock garden, and finally the magnificent rose garden. Always he insisted on having the plants well grown. Other botanical garden directors do this today but they did not twenty or thirty years ago.

The result has been that Brooklyn people come to this garden in tremendous numbers winter and summer to a total of over a million a year. Many people have gained inspiration for life work in botany or horticulture, because they first saw beautiful plants here. I hope persons inspecting the grounds today will remember that Dr. Gager believed, not only that this botanical garden should do useful scientific work, but that it should be a place where people could find repose from the crowded city. He believed very strongly that the future of botany depended upon interesting more people in botany through the beauty of the growing plants spread out before them at all seasons of the year.

(2) *Popular Education.* Dr. Gager was preëminently an educator. His greatest success was in the dissemination of botanical knowledge. In 1912 Dr. E. W. Olive became Curator of Public Instruction. In 1913 Miss Ellen Eddy Shaw was appointed Instructor of Elementary Education. In 1916 she was appointed Curator and at that time this phase of education was definitely separated from public instruction. Miss Shaw has done much to interest the tens of thousands of children who for nearly thirty years have been coming here for various kinds of instruction. As far as I have any record this was the first time that a botanic garden gave elementary instruction to children. In addition to ordinary teaching there was practice in planting seeds and in developing small garden plots, each one of which belonged to a particular child for the year. This does not seem particularly unusual today because it has become a popular thing all over this great land, but Dr. Gager was one of the first, if not the first, to recognize the value of such instruction.

(3) *The Promotion of Research.* The work of a Director of a great garden leaves little time for extensive research work. Therefore it is not surprising that Dr. Gager himself did not contribute greatly to the advance of science along some particular line after he became Director. He wrote a good deal it is true, and many of his writings are of great value. One report that I remember particularly dealt with the botanic gardens of the world, giving the information as to where each one was, when it was founded, how many acres it covered, who the directors had been and were, and what work it primarily stressed. The thing that seems to me important is that Dr. Gager realized the importance of research, and that he facilitated the researches of others. I remember a famous college president who was interested in History, Government and Economics who during his term built up splendid staffs and courses in these fields, while neglecting the Fine Arts and the sciences. It seems to me that Dr. Gager was the exact opposite because he did not neglect any of the fields in which a botanical garden might function, and he was thoroughly sympathetic in building up departments which did not lie within the range of his own particular interests. It is also characteristic of him that he did not in any way "drive" his curators but rather

that he developed a different relationship with them than is the case between the head and the subordinates in many other institutions. He depended on his curators to carry out their assignments and accepted suggestions or modifications of plans from time to time.

Research was the primary feature of the departments of plant breeding and of pathology. Many investigations were conducted in the taxonomy of certain groups of plants and these investigations included exploratory trips made to various parts of the United State, to Cuba, to Puerto Rico and other parts of the world. There were studies in flower structures, in genetics, in disease resistance, etc. The work in these fields shows again the broadness of his vision and of his sympathy in research in many widely differing problems.

(4) *Coöperation with Botanical and Horticultural Organizations.* Botanical gardens have for a long time exchanged seeds, rare plants and herbarium specimens. It has been the custom for an institution to send one of its curators to visit other institutions to lecture or to study. I have no personal knowledge of how many different botanical gardens Dr. Gager and his curators may have visited in the past quarter century or to how many botanical societies they may have belonged. Dr. Gager had been president of both the Botanical Society of America and of the Torrey Botanical Club, and Vice-President and Chairman of the Botanical Section of the American Association for the Advancement of Science. He had been a member of the Botanical Committee of both the Chicago and the New York Worlds Fairs and and a member of several committees of the National Research Council, and of other important organizations too numerous to mention.

I do have personal knowledge of the coöperation which Dr. Gager gave to various horticultural societies, and I wish to go into more detail about this because I know of no other institution which has done so much in this field.

I first met Dr. Gager because when I was the very new president of the very new American Iris Society I came to Brooklyn to ask his help in establishing a test garden for Japanese Irises. Dr. Gager was most cordial and encouraging to me. He authorized the project. A collection of Japanese Irises was established.

Nomenclature was studied; color classifications were worked out; soil, fertilizer and moisture requirements were studied in detail. Dr. Reed even made a trip to Japan to get first hand knowledge. Miss Maud H. Purdy and Miss Louise B. Mansfield made water color drawings which are the authoritative record of the recognized varieties.

Dr. Gager was willing to coöperate with a small new society which had not proved its worth. He made it possible for that society to publish the first authoritative information about this beautiful and often difficult group of Irises. I think in contrast of a prominent engineer whom I have known over thirty years. His work for many civic projects both in his own state and in the nation at large have brought him public respect. My respect for him, however, was almost entirely destroyed, because I learned that some years ago when he was asked to help in a worthy public work, he declined because the organization involved was new and had not yet proved its ability. He did not know whether it could succeed. He said that he personally could not afford to be associated with any failure. This narrow and selfish point of view, is one shared by many otherwise fine people. It certainly was not the point of view of Dr. Gager. He never took time to think whether a new organization would succeed or fail, or whether failure in something with which he coöperated would reflect on him personally. All he thought of was to help. What he did for the American Iris Society he did with many other similar horticultural societies. I mention it in detail because it was my first experience with him and with the Brooklyn Botanic Garden.

Dr. Gager was a Director of the Horticultural Society of New York from 1928 to 1943, and a Vice-President from 1937 to 1943. His wise, kindly, guiding hand could be seen in much of the work of that society. In its great flower shows, the Brooklyn Botanic Garden staged some of the most effective educational exhibits. Perhaps the finest of these was the demonstration of the propagation of plants by various methods. There were shown the seeds, the resulting young seedlings a few days and then a few weeks old, then finally a few months or a few years old. There were cuttings, rooted cuttings, young plants after they had been grown some months or years. There were cions, grafts and grafted plants,

buds and budded plants, all in the various stages of their growth. Not only were the entire plants shown but plants were split and cut so that the union between the cion and the stock was demonstarted in cross section.

It seems to me that one of Dr. Gager's most important undertakings was his work in connection with the organization of The American Association of Botanical Gardens and Arboretums. This association, by building more effective coöperation between existing botanic gardens and encouraging the establishment of new ones in cities and towns which do not now have them, may carry out on a national scale Dr. Gager's belief in the importance of interesting the public if botanical science is to continue to progress. He saw, before many others did, that the day of the privately endowed institution is coming to a close. If the botanical institutions are to continue under private management rather than be government sponsored and subject to political influence, then great numbers of people must become interested enough to demand this.

At Cleveland where the new association was born, Dr. Gager became a trustee, which position he held until his death. He made one of the most important addresses and inspired the entire meeting. He had that wonderful quality of carrying his audiences with him.

It was not the first time that I had seen him do this. Just as he had helped me when the American Iris Society was new, he helped me again by coming to Swarthmore College when the Scott Horticultural Foundation was quite new. Before a great audience gathered on Founders Day he outlined the relationship of botany, the knowledge and love of plants, and of gardening, to other phases of education. He did it so happily and with so much humor that the President of the College and the professors as well as students came away with a totally new point of view about the importance of the planting of trees, shrubs and flowers on the college campus. This ability to tell about plant life in a way to interest all kinds of people, young and old, was one of Dr. Gager's greatest gifts.

I do not wish to give the impression that I believe everything that has been accomplished here in Brooklyn was done by Dr. Gager alone. No one person could have brought this institution in this comparatively small number of years to its present condition.

Over the Director there was the governing committee headed for more than ten years by Mr. Alfred T. White, then for a shorter term by Mr. Frank Bailey, and for the last 18 years by Miss Hilda Loines who is presiding at this meeting today. He had the help of this committee, the help of the trustees of the Institute, the help of the Woman's Auxiliary. He had the devotion of the members of the staff and of all the workers of the Garden.

I should like to quote from what Dr. Wm. J. Robbins of the New York Botanical Garden wrote of him: "Few men have been able to combine, as Dr. Gager did, horticulture and botany, education and research, the applied and the scientific, civic interests and professional duties. A man of the highest ideals, Dr. Gager did not hesitate to oppose attitudes, ideas or trends which he considered unwise or ill considered or to correct errors in fact or statement in the fields with which he was familiar. Yet no worthy project related to his fields of interest failed to receive quick and generous support. His career illustrates how much can be done by a man of ability who devotes himself consistently and conscientiously to a subject he considers worthy of his utmost effort."

I have tried to tell you some of the things I have known about Dr. Gager. When I first came here it was as a stranger for technical horticultural help, but as I continued to come here particularly in the later years, I came to look upon him as a friend with whom I could talk over many personal problems, and I often came very much more for such personal advice than for the direct business of the garden. Generous, kindly, humorous and tolerant he was a friend I shall remember as long as I live. It seems to me that the quotation, from Wordsworth, which he had inscribed over the entrance to the Children's Garden House, is peculiarly fitting to Dr. Gager:

"He is happiest who hath power
To gather wisdom from a flower."

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The Brooklyn Botanic Garden renders a public service in its endeavor to advance a knowledge of plants, affording educational advantages, and carrying on fundamental investigations. Members of the Garden have the opportunity of furthering these aims.

Special membership privileges are also offered as follows:

1. Advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, and the best ways to grow plants successfully, involving methods of culture, and control of insect and fungous pests.
2. The naming of botanical specimens submitted for determination.
3. Periodical distribution of surplus ornamental plant material and seeds.
4. Invitations for self and friends to the Annual Spring Inspection, and to spring and fall "Flower Days"; cards of admission to all exhibitions and openings preceding the admission of the general public, and to receptions; admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Services of a guide (by appointment) for self and party, when visiting the Garden.
6. Free tuition in all courses of instruction, except that in greenhouse and laboratory courses a small fee is charged to cover cost of materials, etc.
7. The Library and Herbarium are available for consultation.
8. Announcement cards concerning plants in bloom and the activities of the Garden are sent to members from time to time.
9. As part of its services, the Brooklyn Botanic Garden issues publications of general horticultural interest, and technical papers based upon the researches carried on at the Garden. Special *Guides* to the plantations and collections, *Leaflets* of popular information, and the quarterly *Record,* which includes the *Annual Report* of the Garden's activities, are sent free to members.
10. Membership privileges in other botanic gardens and museums outside of Greater New York are offered to our members when they are visiting other cities and on presentation of Brooklyn Botanic Garden membership card.

CLUB MEMBERSHIPS

For many years the Botanic Garden has had the pleasure of cooperating in numerous ways with Garden Clubs, Women's Clubs, and other organizations of the Metropolitan area, and a plan has been adopted whereby such organizations may become definitely identified with the work of the Garden in promoting an interest in plant life and horticulture, as follows:

Annual Memberships.—Garden Clubs or other organizations may qualify as Annual Members of the Garden on election by the Board of Trustees and payment of the annual membership fee of Ten Dollars. Each annual member club may designate one of its officers or other member to receive such invitations, notices, and publications as go to individual annual members and to represent the club at all Botanic Garden functions, including "Flower Days" and the annual Spring Inspection in May.

The Club may also have the following privileges:

a. *The services of a Botanic Garden docent or guide* for a tour of the plantations or conservatories, followed by tea. No parties of less than ten adults will be conducted. Schedule for such events must be arranged in advance, at dates mutually convenient to the Botanic Garden and the Club.

b. *One lecture a year* by a member of the Garden staff. This may be either (1) a lecture given to the Garden Club at the Botanic Garden or (2) a lecture given at a place specified by the Garden Club. A list of speakers and subjects available in these two categories will be mailed on request.

Arrangements will be facilitated if the Club will, with each request, designate at least two names.

c. One member of the club is entitled annually to free tuition in courses of instruction for which tuition is charged to non-members. In greenhouse and laboratory courses a nominal fee is charged to cover cost of material.

Sustaining Memberships.—Any club or other organization may become a Sustaining Member of the Garden on election by the Board of Trustees and annual payment to the Garden of the sustaining membership fee of Twenty-five Dollars.

Sustaining membership clubs enjoy the full privileges of annual membership, not only in the Botanic Garden but also in the Brooklyn Museum and The Institute at the Academy of Music. They may designate three members who may receive free tuition in Botanic Garden courses of instruction for which tuition is charged to non-members. They are entitled each year to two lectures free, by a lecturer chosen from the Garden's list of lecturers.

OUT-OF-TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco, Calif.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Chicago Natural History Museum, Chicago, Ill.
Cranbrook Institute of Science, Bloomfield Hills, Mich.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, Calif.

CLASSES OF MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1. Annual, by annual payment of	$ 10
2. Sustaining, by annual payment of	25
3. Contributing, by annual payment of ..	100
4. Life, by one payment of	500
5. Permanent, by one payment of	2,500
6. Donor, by one payment of	10,000
7. Patron, by one payment of	25,000
8. Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members also enjoy the special privileges indicated on a preceding page.

Further information concerning membership may be had by addressing the Director, Brooklyn Botanic Garden, Brooklyn 25, N. Y., or by personal conference by appointment. Telephone, MAin 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used exclusively for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical research.
3. The endowment of special gardens and collections.
4. The Library.
5. The Herbarium.
6. Extending and enriching our work of public education.
7. The purchase and collecting of plants.
8. Popular botanical publication.
9. Illustrations for publications and lectures.
10. The beautifying of the grounds.

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (total cost, about $300,000), and other permanent improvements to a total of more than $281,000, has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation. Certain salaries are paid, in whole or in part, from private funds.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase with private funds all publications for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items. These collections, available without charge for public use, are the property of the Trustees.

The interest on One Million Dollars at the rate of 3.5 per cent, added to the present private funds income, would restore that income to the 1930 figure. The Director will be glad to give full information as to the uses for which such additional income is needed.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Oriental Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 302, or by mail (1000 Washington Avenue, Brooklyn 25), or by telephone (MAin 2–4433).

View in the Wild Flower Garden, along the brook. (9121)

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXIII JULY, 1944 NO. 3

PROSPECTUS: 1944–1945

COURSES OF INSTRUCTION

Courses for adults and children are classified as follows:

For members and the general public ("A" courses, p. 180)
For teachers ("B" courses, p. 186)
For children ("C" courses, p. 188)
For special groups ("D" courses, p. 188)
Investigation ("E" courses, p. 189)

Any course may be withdrawn if less than ten persons apply for registration.

Registration.—Because of the limited space available in the instructional greenhouses, and for other reasons, the number of persons that can be registered in many of the courses must be limited. Those who desire to attend any course are urged to send in their applications, with entrance fees, to the Secretary, Brooklyn Botanic Garden, several days in advance of the first meeting. This avoids delay at the beginning of the first session, ensures a place in the course, and enables the instructor to provide adequate material for the class.

Persons are requested not to register in any course unless they are reasonably confident that they can attend the sessions regularly and throughout. This is especially important where the number is limited; for it is obvious that those who register and do not attend may deprive someone else of the privilege of attending.

Greenhouse Courses.—Because of limited space in the greenhouses it has become necessary to make the ruling that no person shall take more than two spring greenhouse courses in any one year.

A. Courses for Members and the General Public

Although these courses are designed primarily for Members of the Botanic Garden, they are open (unless otherwise specified) to any one who has a general interest in plants. Teachers are welcome. Starred courses (*) are open also, for credit, to students of Long Island University, and are described in the current Long Island University catalog. In harmony with an agreement entered into in the spring of 1935, the Botanic Garden, upon recommendation of the Chairman of the Biology Department of Long Island University, offers a course scholarship to one student of the University. A similar arrangement has been made with Brooklyn College. (Cf. p. 186.)

Fall

A1. House Plants.—*Five Wednesdays, 10:30 a.m., November 1 to 29.* House plants for decoration and interest. How to make them thrive. Raising new plants, which become the property of class members. Instruction in potting, making cuttings, mixing soils, etc. On account of limited space in the greenhouses, this class must be limited to 50 persons. Registration according to the order of application. *Fee to non-members, $5 (including greenhouse fee); to members, $3 greenhouse fee.* Mr. Free.

A4. Your Garden This Fall.—*Five Mondays, 10:30 a.m., October 2 to 30.* Getting ready for next year's garden. Soil improvement by means of cover crops; fall planting for early vegetables; pruning; propagating; planting useful and ornamental trees and shrubs; dormant spraying; winter protection. *No fee.* Mr. Free.

***A5. Trees and Shrubs in Winter.**—*Ten Saturdays, 2:30 p.m., September 30 to December 2.* Outdoor lessons, in the Botanic Garden and in the parks and woodlands of Greater New York, on the characteristics of our common trees and shrubs, both native and cultivated, emphasizing their distinguishing features in the winter condition. The habits, requirements as to soil, etc., and

* All starred courses are open for university or college credit to students of Long Island University and Brooklyn College. See above, and p. 186.

the use of various species in landscape art are also discussed. *Fee to non-members, $3.* The first session will be held at the Brooklyn Botanic Garden. Dr. Graves.

A6. Trees in Prospect Park.—*Eight Tuesdays, 11 a.m. to 12:30, September 19 to November 14 (omitting November 7).* Outdoor meetings to study the trees of Prospect Park. American and Old World trees will be considered, and particular attention given to large trees. *Fee to non-members, $2.50.* Mr. Doney.

A7. Relations of Plants to Mankind.—*Five Mondays, 11 a.m., November 6 to December 4. No fee.*

November 6. First Principles: Plant Products and How they are Formed. Miss Rusk.
November 13. Plants and People. Mr. Free.
November 20. The World's Cereal Crops. Dr. Reed.
November 27. The Pineapple Industry. Dr. Cheney.
December 4. The Breeding of Trees. Dr. Graves.

A13. Fall Wild Flowers and Ferns: Field Course.—*Six Saturdays, 2:30 p.m., September 16 to October 21.* Trips in the Botanic Garden and in the woodlands near the City, to learn to recognize the fall-blooming plants of woods and road-sides, and the fruits of wild plants. First meeting at the Botanic Garden. *Fee to non-members, $2.* Miss Rusk.

A15. Native Ferns in the Botanic Garden.—*Four Mondays, 6 to 7 p.m., September 11 to October 2.* Meetings in the Wild Flower Garden of the Brooklyn Botanic Garden, where about twenty-five kinds of our native ferns are growing. Sure and easy ways of knowing these ferns are pointed out. No rough walking. (Spring course A16, page 184, is similar.) *Fee to non-members, $1.* Miss Rusk.

***A18. Wild Flowers and Ferns: Field and Laboratory Study.**—*Thirty Thursdays, beginning September 21.* Section 1, *10:30 a.m. to 12:30;* section 2, *4:30 to 6:30 p.m.* A series of two-hour sessions for those who wish to become better acquainted with wild flowers. Field and laboratory work are distributed according to the weather, the season, and the needs of the class. The field

* See pp. 180, 186.

work is done in the Brooklyn Botanic Garden. In the laboratory, plants are studied for flower structure and family relationships, compared and identified, and mounted as permanent specimens. Fresh plants are pressed during the growing season; dried and preserved plants are used in the winter. *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.*

Miss Rusk.

***A31. Ornamental Shrubs: Fall Course.**—*Six Wednesdays, 11 a.m., September 20 to October 25.* Outdoor sessions in the Botanic Garden, to study the common species and varieties of cultivated shrubs, emphasizing those desirable for planting on the home grounds. Fall flowers and fruits of ornamental shrubs and small trees, also evergreen shrubs, are considered. This is a continuation of the spring course, A30. *Fee to non-members, $2.*

Mr. Doney.

Winter

A22. The World's Food-producing Plants.—*Five Mondays, 3 p.m., January 8 to February 5.* Non-technical talks, illustrated with lantern slides and specimens; followed by tours in the conservatories of the Botanic Garden, where many of the tropical plants are growing. *Fee to non-members, $1.*

1. January 8. American Plants. Corn, potato, tomato, squash, peanut, pineapple, cherimoya, papaya, etc. Dr. Graves and Miss Rusk.
2. January 15. Plants of the Far East and Africa. Rice, soybean, coconut, sugar, breadfruit, orange, banana, mango, etc. Dr. Gundersen and Miss Clarke.
3. January 22. Plants of Western Asia and Europe. Cereals, olive, date, fig, pomegranate, cabbage, carrot, peas, etc. Dr. Gundersen and Miss Clarke.
4. January 29. Beverage Plants. Chocolate, coffee, tea, maté, etc. Dr. Graves and Miss Rusk.
5. February 5. Spices and Food Adjuncts. Cinnamon, vanilla, pepper, ginger, etc. Dr. Graves and Miss Rusk.

* See pp. 180, 186.

SPRING

A3. Herbs: How to Grow and Use Them.—*Six Tuesdays, 10:30 a.m., March 6 to April 10.* Lectures and practical work in the greenhouses. Plants raised become the property of class members. *Fee to non-members, $5 (including greenhouse fee); to members, $3 greenhouse fee.*

March 6. Herbs in History and Legend. Herbals. Modern Books on Herbs and Herb Cookery. Miss Van Brunt.

March 13. Lecture: Planning the Herb Garden. Miss Van Brunt.
Greenhouse Work: Starting Herbs from Cuttings. Miss Dorward.

March 20. Lecture: Planting the Herb Garden. Miss Van Brunt.
Greenhouse Work: Starting Herbs from Seed. Miss Dorward.

March 27. Cooking with Herbs. Practical Demonstrations with the Cooperation of the Brooklyn Union Gas Company.

April 3. Other Household Uses of Herbs. Aromatic Herbs. Herbal Therapy in House and Garden. Miss Van Brunt.

April 10. Lecture: Some American Herb Gardens. Miss Van Brunt.
Greenhouse Work: Potting up Rooted Cuttings; Pricking out Seedlings. Miss Dorward.

A8. Trees in the Botanic Garden and Prospect Park.—*Eight Mondays, 10:45 a.m. to 12, April 9 to May 28.* Outdoor meetings to study more than 100 species of trees, native and cultivated, including their economic uses and value in landscape art. *Fee to non-members, $2.50.* Dr. Graves, Dr. Gundersen.

***A9. Trees and Shrubs in Spring and Summer.**—*Ten Saturdays, 2:30 p.m., April 7 to June 9.* Outdoor lessons in the Botanic Garden and in the parks and woodlands of Greater New York. Similar to A5, except that the species are studied in their spring and summer conditions. First meeting at the Botanic Garden. *Fee to non-members, $3.* Dr. Graves, Mr. Doney.

* See pp. 180, 186.

A11. Wild Flowers and Ferns: Field Course.—*Six Saturdays, 2:30 p.m., April 28 to June 2.* Trips in the Botanic Garden and in the woodlands near the City, for field identification of flowers and ferns of spring and early summer. *Fee to non-members, $2.* First meeting at the Botanic Garden. Miss Rusk.

A12. Wild Flowers in the Botanic Garden.—*Eight Monday evenings, 6:30 to 8, April 23 to June 11.* Visits to the Wild Flower Garden of the Botanic Garden, where a large proportion of our most attractive native plants are growing. No rough walking. *Fee to non-members, $2.50.* Miss Rusk.

A16. Native Ferns in the Botanic Garden.—*Four Wednesday evenings, 6:30 to 7:30, May 9 to June 6 (omitting May 30).* Meetings in the Wild Flower Garden of the Brooklyn Botanic Garden, where about twenty-five of our native ferns are growing. Sure and easy ways of knowing these ferns are pointed out. No rough walking. (Similar to Fall Course A15, page 181.) *Fee to non-members, $1.* Miss Rusk.

A28. The Small Vegetable and Flower Garden.—*Five Wednesdays, 10:30 a.m., February 28 to March 28.* The preparation of soil, pruning of roses, raising of seedlings; greenhouse and practical work in pricking. Class limited to 45 persons. *Fee to non-members, $6 (including greenhouse fee); to members, $3 greenhouse fee.* Miss Shaw, Miss Dorward.

***A30. Ornamental Shrubs: Spring Course.**—*Ten Wednesdays, 11 a.m., April 11 to June 13.* Outdoor meetings on the grounds of the Botanic Garden. The principal flowering shrubs and small trees are considered at their times of flowering, emphasis being placed on their uses in plantings, their cultivation, and distinguishing characters. *Fee to non-members, $3.* Mr. Doney.

A37. Lilacs in Flower.—*Four Wednesdays, 4:15 to 5:30, May 2, 9, 16, and June 6, and one other day* to be arranged. Five outdoor lessons. The comprehensive collection of the Garden affords opportunity for the study of more than 100 kinds of lilacs. In the last lesson, culture and propagation are taken up; cuttings, which become the property of those taking the course, are prepared for rooting. *Fee to non-members, $2.*

Dr. Gundersen, Mr. Free, Miss Clarke.

* See pp. 180, 186.

A39. Flowers for your Garden.—*Six Mondays, 3:30 p.m., April 16 to May 21.* Informal lectures and discussions on culture and the most suitable varieties of flowers for your garden, as follows: 1. April 16. Spring-flowering Bulbs. 2. April 23. Rock Garden Flowers. 3. April 30. Woodland Flowers. 4 and 5. May 7 and 14. Perennials. 6. May 21. Annuals. *Fee to non-members, $2.* Miss Clarke.

A44. Gardens within a Garden.—*Seven Tuesdays, 4 p.m., April 10 to May 29 (omitting May 8).* A series of trips in the Botanic Garden, designed especially for Members of the Garden and of the Institute, to enable them to become acquainted with the general plan of the Botanic Garden and the nature of the special gardens, as well as to see the various floral displays when they are at their best. The schedule of individual trips will be announced later. *No fee.* Dr. Graves and others.

A48. The Vegetable Garden.—*Five Fridays, 10:30 a.m., March 16 to April 13.* Lectures and demonstrations. Getting the most from a small plot by companion and succession cropping. Soil improvement and maintenance of fertility. Seed sowing, indoors and out; thinning; cultivating; harvesting and storing. *No fee.* Mr. Free, Miss Dorward.

A49. The Vegetable Garden: Greenhouse and Lecture Course.—*Six Thursdays, 10:30 a.m., March 15 to April 19.* Same as A48, with the addition of practical work in the greenhouse. Vegetables which are usually raised under glass are started by class members, who have the privilege of keeping the young plants thus raised. Largely seeing and doing. Limited to 50 persons. *Fee to non-members, $5 (including greenhouse fee); to members, $3 greenhouse fee.* Mr. Free.

FLOWER DAYS

To afford an opportunity to members to see the various floral features of the Garden and the special outdoor collections when they are at their best, the following "Flower Days" have been observed, and will be held according to postcard announcements. Each event will be in charge of a specialist on the particular flower concerned.

Apple and Cherry Blossom Day.	Dr. Reed.
Lilac Day.	Dr. Gundersen.
Iris Day.	Dr. Reed.
Wild Flower Garden Day.	Dr. Svenson.
Annual Rose Garden Day.	Mr. Free, Mr. Tilley.
Fall Rose Garden Day.	Mr. Free, Mr. Tilley.
Herb Garden Day.	Mr. Free.
Chrysanthemum Day.	Mr. Free.

B. Courses for Teachers

These courses have been accepted by the Board of Education of New York City for "in-service credit," one credit being granted for each 15 hours. Through an agreement with Long Island University, undergraduate credit for certain courses will be allowed toward fulfilling the requirements for a University degree, provided the admission requirements at the University and the laboratory requirements at the Botanic Garden have been fulfilled. Such courses are starred (*). By special arrangement with the institution concerned, these credits have also been used as undergraduate credits in other colleges and universities. Long Island University students desirous of electing any of these or of the other courses should notify Dean Tristram W. Metcalfe or Dr. Ralph H. Cheney, who will give the candidate a card entitling him to admission to the course. The student should present this card at the beginning of the first session of the course.

B2. Plant Study.—*Fifteen Thursdays, 4 p.m., beginning September 28.* The subjects covered are those laid down in the Science Syllabus for the seventh and eighth years, such as New Plants from Old, Parts of Plants Used for Food, Plants of Different Zones. Practical work in the greenhouse and laboratory, and on the grounds. Two credits. *Fee to non-members, $5; to members, $3 laboratory fee.*

Miss Shaw, Miss Hammond, Miss Carroll.

B3. Plant Culture and Gardening.—*Thirty Wednesdays, 4 p.m., beginning September 20.* Planned primarily for teachers. This course is especially recommended by the Board of Educa-

tion. It consists, throughout fall, winter, and early spring, of greenhouse work, and later, outdoor instruction in starting a garden. Subjects covered are the taking up of plants, planting of such fall bulbs as are available, propagation by different methods, study of soils, how to plan the small vegetable garden, and the raising of flower seedlings. Limited to 60. Two credits. (No students admitted for a half-year of work. This is a year's course, and credit is not given until May, 1945.) *Fee to non-members, $10 (including greenhouse fee); to members, $5 greenhouse fee.* Miss Shaw, Miss Dorward.

B5. Garden Practice.—For teachers only. Offered as Nature-Garden Science, in conjunction with the Board of Education. For details see Board of Education Announcement of Courses. Mr. Marvin M. Brooks, Miss Shaw, Miss Miner, Miss Hammond.

B7. Greenhouse Work.—*Thirty Tuesdays, 4 p.m., beginning September 26.* Designed for those teachers who have completed B3 and who desire to continue study of indoor culture of plants. Lectures, demonstrations and practical greenhouse work on propagating and growing many different types of flowering and foliage house plants. Two credits. *Fee to non-members, $10 (including greenhouse fee); to members, $5 greenhouse fee.* Miss Dorward.

***B10. Wild Flowers and Ferns: Field and Laboratory Study.**—*Thirty Thursdays, 4:30 to 6:30 p.m., beginning September 21.* Same as course A18. See pp. 181, 182. Four credits. *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.* Miss Rusk.

***B13–14. Trees and Shrubs of Greater New York.**—*Twenty Saturdays, 2:30 p.m., September 30 to December 2; and April 7 to June 9, 1945.* Two-hour sessions. A course of outdoor lessons in the Botanic Garden and in the parks and woodlands of Greater New York, the principal object being to learn to know the common trees and shrubs, both native and naturalized, of the eastern United States, which are well represented in this region. The species are considered in systematic order, in both winter and summer conditions, and the outstanding features pointed out by

* See pp. 180, 186.

which they may most easily be recognized. First meeting at the Botanic Garden. Two credits. *Fee to non-members, $6.*

Dr. Graves, Mr. Doney.

C. Children's Courses

More than thirty separate courses are given Saturday mornings for boys and girls from eight to nineteen years old in the spring, fall, and winter. Miss Shaw and Assistants.

I. Fall Course.—*Eight Saturday mornings, 9–11:15, October 28 to December 16.* Nature study on the grounds; plant propagation in the greenhouse, using stem and leaf cuttings; bulbs and corms; making of terrariums and dish gardens. Enrollment limited to 175. *Fee, fifteen cents for the course.*

II. Winter Course.—*Six Saturday mornings, 9–11:15, January 13 to February 17.* Children who have shown unusual ability are chosen from the fall group for early winter work. Group limited to 50. *No fee.*

III. Spring Course.—*Eight Saturday mornings, 9–11:15, February 24 to April 14.* Nature study and preparation for the outdoor garden, including studies of seed germination, seed sowing in the greenhouse, and the making of garden plans. Enrollment limited to 200. *Fee, fifteen cents for the course.*

IV. Outdoor Garden Course.—*Begins April 28.* The outdoor garden is open throughout the summer season, and time is arranged to fit in with children's vacation schedules. No child is assigned an outdoor garden who has not had the spring preparatory work. Group limited to 200 children. *Fee, twenty-five or thirty-five cents, depending on the size of the garden.*

D. Courses for Special Groups

D1. Medicinal Plants: A Course for Nurses-in-Training.—To be arranged on request. Dr. Graves.

D2–3. Trees and Shrubs: Spring and Fall Courses for Employees of the Park Department.—To be arranged on request.

Dr. Graves, Mr. Doney.

D4. Gardening: for Employees of the Park Department.—To be arranged on request. Mr. Free.

E. Investigation

1. *Graduate Work for University Credit*

By the terms of a cooperative agreement between New York University and the Brooklyn Botanic Garden, properly qualified graduate students may arrange to carry on investigations in botany at the Garden under the direction of members of the Garden Staff, who are also officers of instruction in the Graduate School of the University. The advantages of the library, laboratories, herbarium, and collections of living plants at the Garden are freely at the disposal of students registered at New York University for such work. Such properly enrolled graduate students are charged no additional fees by the Garden.

Research work in botany presupposes a knowledge of plants obtained from a study in field and laboratory. Prerequisites include college courses along such lines as morphology, physiology, taxonomy, and genetics. Bacteriology and mycology are special prerequisites for E6. For E8, plant pathology and basic training in forestry are also required.

E6. Research in Mycology and Plant Pathology. Dr. Reed.

E8. Research in Forest Pathology. Dr. Graves.

E9. Research in the Systematic Botany of the Flowering Plants. Dr. Svenson.

E10. Research in the Structure of Flowers. Dr. Gundersen.

2. *Independent Investigation*

The facilities of the laboratories, conservatories, library, and herbarium are available to qualified investigators who wish to carry on independent researches in their chosen field of botany. By "qualified investigators" is meant those who have obtained the doctor's degree or have completed most of the requirements for the doctorate. The laboratories are open for such use only during the hours when the Laboratory Building is regularly open, viz. 9 a.m.–5 p.m. Mondays to Fridays; 9–12 a.m. Saturdays; except on holidays, when the building is closed. There is a charge of $25 per year, payable to the Botanic Garden.

COOPERATION WITH LOCAL SCHOOLS

The Brooklyn Botanic Garden aims to cooperate in every practicable way with the public and private schools of Greater New York in all matters pertaining to the study of plants and closely related subjects.

Geography classes, as well as classes in nature study and botany, find the collection of useful plants in the Economic Plant House, the Local Flora Section, the Herb Garden, and also the Meridian Panel, the Armillary Sphere, and the Labeled Glacial Boulders, valuable adjuncts to their class work. Illustrated lectures at the Garden for geography classes may be arranged.

To visiting college classes in geology and physiography the Botanic Garden offers interesting material for a study of glaciation. Notable features are a portion of the Harbor Hill terminal moraine (Boulder Hill), the morainal pond (the "Lake"), the labeled glacial boulders, and the Flatbush outwash plain. See Guide No. 7, *"The Story of our Boulders: Glacial Geology of the Brooklyn Botanic Garden."*

Talks at Secondary Schools and Colleges.—Informal illustrated talks on various subjects of an advanced botanical nature are always gladly given at Secondary Schools and Colleges by members of the staff. Arrangements for such talks should be made with the *Curator of Public Instruction.*

School Classes at the Garden.—Public and private schools, both elementary and secondary, may arrange for classes to come to the Botanic Garden for illustrated lectures by members of the Garden staff, or for guided tours of instruction through the conservatories and outdoor plantations.

Visiting classes must be accompanied by their teachers, and notice of such visits should be sent at least one week in advance. Blank forms for this purpose are provided by the Garden. Lists of talks and trips offered will be sent on request: for Junior High and Elementary Schools address the *Curator of Elementary Instruction;* for High Schools, the *Curator of Public Instruction.*

Seeds for School and Home Planting.—Penny packets of flower and vegetable seeds are put up by the Botanic Garden for children's use. In the early spring, lists of these seeds, order

blanks for teachers and pupils, and other information may be secured on application to the *Curator of Elementary Instruction.*

Loan Sets of Lantern Slides.—Sets of lantern slides have been prepared for loan to the schools. Each set is accompanied by a short lecture text of explanatory nature. In all cases these sets must be called for by a responsible school messenger and returned promptly in good condition. Address, by mail or telephone (MAin 2–4433), Mr. Frank Stoll, *Custodian.* The subjects now available are as follows. Other sets are in preparation.

1. Plant Life
2. Common Trees
3. Forestry
4. Soil Conservation
5. Conservation of Native Plants
6. Spring Wild Flowers
7. Summer Wild Flowers
8. Fall Wild Flowers
9. Ferns and Fern Allies

Study and Loan Material for Elementary Schools.—To the extent of its facilities, the Botanic Garden will provide, on request, various plants and materials for nature study. Requests from Elementary Schools should be made to Miss Elsie T. Hammond, and material should be called for at the Information Booth on the ground floor.

Study and Loan Material for Colleges, High Schools, and Junior High Schools

The Botanic Garden is able to supply botanical material for study. Geraniums, coleus, tradescantia, bryophyllum, sedum, mimosa, and various fungi, liverworts and ferns may be available. Some material illustrating genetics may be furnished, for example, sorghum seeds for growing F_2 seedlings showing red and green seedling stem characters with three to one ratios; others giving normal green and albino seedlings; pea seeds of tall and dwarf strains. Cultures of molds and paramecia may be available. Specimens and mounts for exhibit are also available.

A small charge is made for the material supplied or loaned.

BUREAU OF PUBLIC INFORMATION

Consultation and advice, and the facilities of the library and herbarium are freely at the service of members of the Botanic Garden and (to a limited extent) of others with special problems relating to plants or plant products, especially in the following subjects:

1. The care of trees, shrubs, and lawns.
2. The growing of cultivated plants and their arrangement; also their adaptation to soils, climate, and other factors.
3. Determination (naming) of flowering plants.
4. Plant diseases and determination of fungi.
5. Plant geography and ecology.

Inquiries should be directed to the *Curator of Public Instruction,* preferably by letter.

Determination of Specimens.—If the identification of plants is desired, the material submitted should include flowers, and fruit when obtainable. Identification of a single leaf is often impossible. For identification of plant diseases, representative portions of the part diseased should be sent.

CONDUCTED TOURS

To assist members and others in visiting the plantations the services of a guide may be obtained. Arrangements should be made by application to the *Curator of Public Instruction* one week in advance. No parties of less than ten adults will be conducted. This service is free of charge to members and accompanying friends. For information concerning membership in the Botanic Garden see pages i to v of this PROSPECTUS.

MEETINGS OF OUTSIDE ORGANIZATIONS

The Brooklyn Botanic Garden is glad to welcome outside organizations wishing to hold meetings at the Garden, provided the general purpose of the organization is closely allied to that of the Botanic Garden (e.g., Botanical Groups, Garden Clubs, Nature Study Clubs, Conservation Organizations, etc.), or that the specific

purpose of the meeting is of mutual interest and advantage to the organization and the Botanic Garden. Meetings must always be arranged in advance. A folder giving full details, and an application blank may be had by addressing *The Custodian.*

PLANTATIONS

The plant families are arranged in accordance with the Engler and Prantl system. In addition to this systematic arrangement, there are a number of special collections of horticultural varieties —azaleas, cannas, crocus, chrysanthemums, daffodils, ferns, flowering cherries, flowering crab apples, iris, ivies, lilacs, lotus, peonies, rhododendrons, and waterlilies. There are several specialized gardens, hence the popular designation "Gardens Within a Garden." These are:

Children's Garden
Herb Garden, including culinary and medicinal herbs, and Elizabethan Knot Gardens
Oriental Garden
Rock Garden
Rose Garden
Shakespeare Garden
Wall Garden
Wild Flower Garden (Local Flora Section)

HERBARIA

The Herbarium of Flowering Plants and Ferns consists of approximately 220,000 sheets. Besides North American plants, there are especially good representations from Ecuador, Spain, and the South Sea Islands.

The Cryptogamic Herbarium contains approximately 81,000 specimens of fungi and myxomycetes.

The Herbarium of the American Fern Society, deposited at the Garden by an agreement executed on January 22, 1941, consists of approximately 6,000 sheets of ferns and fern allies.

These herbaria may be consulted daily (except Sundays and holidays) from 9 a.m. until 5 p.m.; Saturdays from 9 a.m. to 12 m. Specimens may be submitted for identification.

LIBRARY

The rapidly growing library of the Garden comprises at present about 23,000 volumes and about 21,000 pamphlets. This is not a circulating library, but is open free for consultation to all persons daily (except Sundays and holidays) from 9 a.m. until 5 p.m. (Saturdays, 9 to 12). More than 1,000 periodicals and serial publications devoted to botany and closely related subjects are normally received. These include the transactions of scientific societies from all quarters of the globe; the bulletins, monographs, reports, and other publications of various departments of the United States Government, as well as those of foreign governments, and of all state agricultural experiment stations and agricultural colleges; the publications of research laboratories, universities, botanic gardens, and other scientific institutions of the world, as well as the files of independent journals devoted to the various phases of plant life. The library is specially rich in publications of foreign countries, and has a growing collection of incunabula and other pre-Linnaean works.

The Library of the American Fern Society, deposited at the Garden by an agreement executed on April 21, 1930, is also open free daily to the general public for reference, under the same regulations as govern the main library.

Bibliographical assistance is rendered to readers by members of the Library staff.

The Brooklyn Institute of Arts and Sciences

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn 25, N. Y.* Telephone, Main 2–4433.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden.* Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than ten adults will be conducted.

To Reach the Garden take B.M.T. Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN

PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Papers:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk. By Norman Taylor. 1923. 108 pages. $1.00.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 96. Inheritance of smut resistance in hybrids of Navarro oats. By George M. Reed. 7 pages. 1942.

No. 97. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1941. By Arthur Harmount Graves. 5 pages. 1942.

No. 98. Flower forms and groups of Dicotyledones. By Alfred Gundersen. 7 pages. 1943.

No. 99. Phytopathology 1867–1942. By George M. Reed. 15 pages. 1943.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail, 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, by mail, 30 cents.

Guide No. 14. The local flora section (native wild flower garden) of the Brooklyn Botanic Garden. 27 pages, 18 illustrations. By Henry K. Svenson. Price, by mail, 30 cents.

Guide No. 15. The Herb Garden of the Brooklyn Botanic Garden. 42 pages; 2 illustrations and map. By Elizabeth Remsen Van Brunt and Virginia Riddle Svenson. Price, by mail, 30 cents.

Guide No. 16. The Medicinal Plant Garden of the Brooklyn Botanic Garden. 45 pages, 12 illustrations. By Arthur H. Graves, Charles W. Ballard, Ralph H. Cheney, and F. J. Pokorny. Price, by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXIII OCTOBER, 1944 NO. 4

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OF THE

BROOKLYN BOTANIC GARDEN

January 1-June 30, 1944

PUBLISHED QUARTERLY

BROOKLYN BOTANIC GARDEN

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THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

FOUNDED, 1824. REINCORPORATED, 1890

ADRIAN VAN SINDEREN, *President.* EDWARD C. BLUM, *Chairman of the Board.*

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BROOKLYN ACADEMY OF MUSIC—30 LAFAYETTE AVENUE—STerling 3–6700

BROOKLYN BOTANIC GARDEN

1000 WASHINGTON AVENUE—MAin 2–4433

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CENTRAL MUSEUM—EASTERN PARKWAY—NEvins 8–5000
CHILDREN'S MUSEUM—BROOKLYN AVENUE AND PARK PLACE
—President 4–2900

MEMBERSHIP

You are cordially invited to become a member of one or all of the Departments of the Brooklyn Institute. The annual fee in each Department is $10, carrying full privileges in the division of your choice and partial privileges in the other two. You may join at any time.

THE DEPARTMENT OF EDUCATION offers its members free admission to more than 300 events; lectures, concerts, motion pictures, young people's programs, field trips, etc. Also: reduced rates for special courses and programs.

MR. DONALD G. C. SINCLAIR, *Chairman, Governing Committee.* JULIUS BLOOM, *Director.*

THE BOTANIC GARDEN offers its members free admission to "Flower Days," Spring Inspection, field trips, and most classes of instruction. Also: guide services, privileges of library and herbarium, free publications, advice on all aspects of gardening, distribution of surplus plant material, and visiting membership privileges in the botanic gardens and museums of other cities.

MR. PHILIP A. BENSON, *Chairman, Governing Committee.* DR. GEORGE S. AVERY, JR., *Director.*

THE MUSEUM offers its members private views of exhibitions, admission to Museum courses, phonograph records and prints from its lending libraries, and docent services. Also: five Museum publications free of charge and other Museum publications at reduced prices.

SIDNEY W. DAVIDSON, *Chairman, Governing Committee.*
MRS. LAURANCE P. ROBERTS, *Director.* ALBERT N. HENRICKSEN, *Assistant Director.*

THE BROOKLYN ACADEMY OF MUSIC is owned and operated by the Brooklyn Institute. Its Opera House, Music Hall, and Ballroom may be rented for concerts, plays, lectures, school ceremonies, dances, and other events.

WILLIAM T. HUNTER, *Chairman, Building Committee.* HERBERT T. SWIN, *Building Superintendent.*

PRIVILEGES OF MEMBERSHIP IN THE BROOKLYN BOTANIC GARDEN

The Brooklyn Botanic Garden renders a public service in its endeavor to advance a knowledge of plants, affording educational advantages, and carrying on fundamental investigations. Members of the Garden have the opportunity of furthering these aims.

Special membership privileges are also offered as follows:

1. Advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, and the best ways to grow plants successfully, involving methods of culture, and control of insect and fungous pests.
2. The naming of botanical specimens submitted for determination.
3. Periodical distribution of surplus ornamental plant material and seeds.
4. Invitations for self and friends to the Annual Spring Inspection, and to spring and fall "Flower Days"; cards of admission to all exhibitions and openings preceding the admission of the general public, and to receptions; admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Services of a guide (by appointment) for self and party, when visiting the Garden.
6. Free tuition in all courses of instruction, except that in greenhouse and laboratory courses a small fee is charged to cover cost of materials, etc.
7. The Library and Herbarium are available for consultation.
8. Announcement cards concerning plants in bloom and the activities of the Garden are sent to members from time to time.
9. As part of its services, the Brooklyn Botanic Garden issues publications of general horticultural interest, and technical papers based upon the researches carried on at the Garden. Special *Guides* to the plantations and collections, *Leaflets* of popular information, and the quarterly *Record,* which includes the *Annual Report* of the Garden's activities, are sent free to members.
10. Membership privileges in other botanic gardens and museums outside of Greater New York are offered to our members when they are visiting other cities and on presentation of Brooklyn Botanic Garden membership card.

CLUB MEMBERSHIPS

For many years the Botanic Garden has had the pleasure of cooperating in numerous ways with Garden Clubs, Women's Clubs, and other organizations of the Metropolitan area, and a plan has been adopted whereby such organizations may become definitely identified with the work of the Garden in promoting an interest in plant life and horticulture, as follows:

Annual Memberships.—Garden Clubs or other organizations may qualify as Annual Members of the Garden on election by the Board of Trustees and payment of the annual membership fee of Ten Dollars. Each annual member club may designate one of its officers or other member to receive such invitations, notices, and publications as go to individual annual members and to represent the club at all Botanic Garden functions, including "Flower Days" and the annual Spring Inspection in May.

The Club may also have the following privileges:

a. *The services of a Botanic Garden docent or guide* for a tour of the plantations or conservatories, followed by tea. No parties of less than ten adults will be conducted. Schedule for such events must be arranged in advance, at dates mutually convenient to the Botanic Garden and the Club.

b. *One lecture a year* by a member of the Garden staff. This may be either (1) a lecture given to the Garden Club at the Botanic Garden or (2) a lecture given at a place specified by the Garden Club. A list of speakers and subjects available in these two categories will be mailed on request.

Arrangements will be facilitated if the Club will, with each request, designate at least two names.

c. One member of the club is entitled annually to free tuition in courses of instruction for which tuition is charged to non-members. In greenhouse and laboratory courses a nominal fee is charged to cover cost of material.

Sustaining Memberships.—Any club or other organization may become a Sustaining Member of the Garden on election by the Board of Trustees and annual payment to the Garden of the sustaining membership fee of Twenty-five Dollars.

Sustaining membership clubs enjoy the full privileges of annual membership, not only in the Botanic Garden but also in the Brooklyn Museum and The Institute at the Academy of Music. They may designate three members who may receive free tuition in Botanic Garden courses of instruction for which tuition is charged to non-members. They are entitled each year to two lectures free, by a lecturer chosen from the Garden's list of lecturers.

OUT-OF-TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco, Calif.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Chicago Natural History Museum, Chicago, Ill.
Cranbrook Institute of Science, Bloomfield Hills, Mich.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, Calif.

CLASSES OF MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1.	Annual, by annual payment of	$ 10
2.	Sustaining, by annual payment of	25
3.	Contributing, by annual payment of ..	100
4.	Life, by one payment of	500
5.	Permanent, by one payment of	2,500
6.	Donor, by one payment of	10,000
7.	Patron, by one payment of	25,000
8.	Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members also enjoy the special privileges indicated on a preceding page.

Further information concerning membership may be had by addressing the Director, Brooklyn Botanic Garden, Brooklyn 25, N. Y., or by personal conference by appointment. Telephone, MAin 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used exclusively for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical research.
3. The endowment of special gardens and collections.
4. The Library.
5. The Herbarium.
6. Extending and enriching our work of public education.
7. The purchase and collecting of plants.
8. Popular botanical publication.
9. Illustrations for publications and lectures.
10. The beautifying of the grounds.

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (total cost, about $300,000), and other permanent improvements to a total of more than $281,000, has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation. Certain salaries are paid, in whole or in part, from private funds.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase with private funds all publications for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items. These collections, available without charge for public use, are the property of the Trustees.

The interest on One Million Dollars at the rate of 3.5 per cent, added to the present private funds income, would restore that income to the 1930 figure. The Director will be glad to give full information as to the uses for which such additional income is needed.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Oriental Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 302, or by mail (1000 Washington Avenue, Brooklyn 25), or by telephone (MAin 2–4433).

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXIII OCTOBER, 1944 NO. 4

SUPPLEMENT TO THE THIRTY-THIRD ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN

JANUARY 1–JUNE 30, 1944

REPORT OF THE DIRECTOR

TO THE BOTANIC GARDEN GOVERNING COMMITTEE:

I have the honor to present herewith a supplement to the thirty-third Annual Report. It covers the six months' period beginning January 1, and ending June 30, 1944, except for the financial report; the latter covers the entire fiscal year 1943–44. It is my hope that the next several reports, at least, will cover the fiscal years. It is on these that our accounting to the City of New York is based. Furthermore, most of our educational and related activities are on a fall-winter-spring schedule, all of which fit admirably into a July 1 to June 30 fiscal year report.

Future numbers of the RECORD will contain articles covering the field of Horticulture as well as reporting significant developments in the Botanic Garden.

The general program reported for the last half of 1943 was continued in the first half of 1944, including all phases of Victory Garden activities (see under Grounds), and cooperation with the C.D.V.O., radio talks, etc.

The following points are dealt with in the accompanying report:

Attendance
Work with Students
Materials for Schools
C. Stuart Gager Memorial Service and Special Days
Library
Herbarium
Grounds
Conservatories
Financial
Research and Related Activities of Curators and Resident Investigators

Respectfully submitted,

GEORGE S. AVERY, JR.
Director

Attendance. The attendance on the grounds for the six months period, January 1 to July 1, 1944, was 687,791.

Work with Students. In the horticultural courses, registration in children's classes, meeting on regular Saturday morning schedules, was well over 200. Registration in teachers' classes, on an advanced level, was 165. In addition, the visiting class attendance was over 24,000 and involved 550 special sessions.[1] Children's Gardens are mentioned briefly under "Grounds."

In eight different courses, ranging from "Relations of Plants to Mankind" to "Wild Flowers and Ferns," the total registration was 171.[2]

Materials for Schools. *From the report of Ellen Eddy Shaw, Curator of Elementary Instruction.* 90% of the Brooklyn schools availed themselves of the privilege of buying penny packets of seed; 60% of the Queens schools, and 50% of those in the Bronx. Brooklyn and Queens are the boroughs we concentrate on. The total number of packets distributed through the schools was 1,166,399. Fifty per cent of the filling of packets is done voluntarily by our children during the summer.

[1] From the report of Ellen Eddy Shaw, Curator of Elementary Instruction.

[2] From the report of Arthur Harmount Graves, Curator of Public Instruction.

There were 91 requests for miscellaneous teaching materials, from 55 institutions, but the amount of material sent out tells little. It might be of interest to take one example. Two thousand three hundred thirty-six plants given away were used in classes totaling over 50,000 pupils, and more than that, the requests for this material sent the name and help of the Brooklyn Botanic Garden from Benjamin Franklin High School in Manhattan, to Newtown High School in Queens, to the Red Hook Housing Project through the C.D.V.O., to the Coney Island and Shore Road Hospitals in Brooklyn, and from elementary schools in the Bronx and Queens back to Brooklyn.

C. Stuart Gager Memorial Service and Special Days. The thirtieth annual Spring Inspection of the Garden was made the occasion of memorial exercises in honor of Dr. Gager, the Garden's first Director. An address of appreciation was delivered by Mr. John C. Wister, Director of the Arthur Hoyt Scott Horticultural Foundation. Miss Hilda Loines, Chairman of the Governing Committee of the Garden, presided. About 250 members and guests were present, and many were later conducted on a tour of the Garden by members of the staff. This meeting is reported in full in an earlier issue (Record **33** (2) : 169–178. 1944).

The Seventeenth Annual Rose Garden Day occurred on June 6. Mr. Walter D. Brownell of Little Compton, R. I., spoke on "Garden rose betterment." This was followed by a tour of the Rose Garden led by Mr. Brownell, Mr. Free and Mr. Tilley. Tea was served in the Rotunda of the Laboratory Building, members of the Woman's Auxiliary acting as hostesses. About 100 members and guests attended, among them Mrs. Walter V. Cranford, co-donor of the Rose Garden, and her daughter, Miss Margaret Cranford.

Library. *From the Report of William E. Jordan, Librarian.* The collections at present comprise 45,425 pieces, of which number 23,288 are volumes and 22,137 are pamphlets, an increase of 69 volumes and 340 pamphlets, or 409 pieces. Volumes purchased totaled 36. Gifts were 14 volumes, 275 pamphlets, and 406 parts. The list of donors is included in Appendix I.

Loans to other institutions totaled 39 items; 1 item was borrowed for the use of our staff.

FINANCIAL STATEMENT FOR THE FISCAL YEAR 1943–1944

I. Private Funds Accounts

Permanent Funds (Restricted[1])	*Principal*	*Unexpended Balance of Income July 1, 1943*	*Income 1943–44*	*Expenditures 1943–44*	*Balance June 30, 1944*
1. Endowment Fund	$ 55,238.67	$ 276.10	$ 1,932.68	$ 2,208.78	$ 0.00
2. Life Membership	11,568.08	55.34	387.40	442.74	0.00
3. George C. Brackett	560.89	7.56	19.60	24.23	2.93
4. Cary Library Fund	2,248.71	39.45	78.68	113.83	4.30
5. Benjamin Stuart Gager	15,180.91	359.05	531.32	286.22	604.15
6. Martha Woodward Stutzer	10,913.34	84.70	382.97	373.34	94.23
7. Mary Bates Spalding	2,974.64	149.56	104.08	0.00	253.64
8. Alfred T. White	272,304.99	1,361.52	9,530.64	10,892.16	0.00
9. A. Augustus Healy Bequest	10,809.60	54.05	378.32	432.37	0.00
10. Robert B. Woodward Bequest	27,030.73	135.15	946.04	1,081.19	0.00
11. Endowment Increment Fund	66,156.02	0.00	2,265.67	2,265.67	0.00
12. A. T. White Memorial Fund	4,248.33	21.24	148.64	169.88	0.00
13. Brooklyn Institute Centennial	32,336.03	161.68	1,131.76	1,293.44	0.00
14. John D. Rockefeller, Jr.	265,062.22	1,325.31	9,277.16	9,056.27	1,546.20
15. Citizens Endowment	269,191.38	1,345.95	9,421.68	9,197.35	1,570.28
16. Henry W. Healy Trust	54,608.53	313.82	1,867.72	0.00	2,181.54
17. Mrs. H. C. Folger Fund	1,005.29	52.49	35.20	35.00	52.69

I. Private Funds Accounts (*Countinued*)

18. John W. Frothingham	10,000.00	50.00	350.00	400.00	0.00
19. F. E. W. Fund	250,000.00	1,250.00	8,750.00	10,000.00	0.00
20. Ellen Eddy Shaw Endowment	24,576.17	1,214.93	853.71	270.75	1,797.89
21. Herbarium Endowment	4,000.00	34.83	140.00	47.75	127.08
22. Public Instruction Endowment	2,234.93	158.12	78.20	18.40	217.92
Totals	$1,392,249.46	$ 8,450.85	$ 48,611.47	$ 48,609.37	$ 8,452.95
Special Accounts (Restricted)					
23. Ella Reussner Trust Income Account		$ 0.00	$ 2,076.78	$ 1,564.31	$ 512.47
24. Sustaining Membership		116.62	1,241.17	1,241.17	116.62
25. Annual Membership		930.83	3,295.48	2,044.65	2,181.66
26. Tuition and Sales		6,130.26	13,389.65	16,784.82	2,735.09
27. Collections Fund		2,427.49	1,684.27	3,785.76	326.00
28. Special Purposes		4,823.33	1,521.93	1,759.60	4,585.66
29. Plant Pathology Research		0.00	6,600.00	6,500.00	100.00
30. Special Contributions		9,028.79	62,783.27	55,503.84	16,308.22
Totals		$23,457.32	$ 92,592.55	$ 89,184.15	$26,865.72
Gross Totals	$1,392,249.46	$31,908.17	$141,204.02	$137,793.52	$35,318.67
Deduct Inter-account transactions			65,233.27	65,233.27	
Grand Total	$1,392,249.46	$31,908.17	$ 75,970.75	$ 72,560.25	$35,318.67

[1] To the educational and scientific work of the Garden.

Herbarium. *From the Report of Henry K. Svenson, Curator.* Loans and accessions of material are outlined in detail in Appendix 6.

Grounds. *From the report of Montague Free, Horticulturist.* The grounds have been maintained in reasonably good condition, thanks to the availability of a few women gardeners and high school boys during the summer months. The summer drought made it difficult to keep most things in good order, but tropical water lilies were the finest in many years.

II. Tax Budget for the Fiscal Year 1943–1944

Account	*Appropriation July 1, 1943*	*Expenditures*	*Balance June 30, 1944*
Personal Service			
Salaries—Regular Employees	$65,325.00	$63,784.90[1]	$ 0.10
Wages—Temporary Employees	23,696.00[1]	25,236.00	0.00
Total Personal Service	$89,021.00	$89,020.90	$ .10
Other than Personal Service			
Office Supplies	$ 100.00	$ 100.00	$ 0.00
Printed Stationery and Forms	100.00	100.00	0.00
Departmental Reports and Bulletins	200.00	200.00	0.00
Printing, Binding and Reproduction	10.00	10.00	0.00
Motor Vehicle Supplies	100.00	71.96	28.04
Laundry and Cleaning Supplies	200.00	197.45	2.55
Medical, Surgical and Laboratory Supplies	100.00	100.00	0.00
Household and Refrigerating Supplies	50.00	50.00	0.00
Fuel Supplies	1,703.97	1,703.97	0.00
Small Tools and Implements	50.00	50.00	0.00
Agricultural, Botanical and Animal Supplies	1,800.00	1,799.09	0.91
Other Operating and Maintenance Supplies	50.00	50.00	0.00
Construction Material	1,200.00	1,200.00	0.00
Postage	35.00	35.00	0.00
Telephone	425.00	423.36	1.64
Expressage and Deliveries	10.00	10.00	0.00
Carfares	10.00	10.00	0.00
Motor Vehicle Repairs	25.00	25.00	0.00
Repairs to Buildings and Structures	350.00	350.00	0.00
Repairs to Office and Other Operating Equipment	50.00	49.70	0.30
Total Supplies and Equipment	$ 6,568.97	$ 6,535.53	$33.44
Grand Totals	$95,589.97	$95,556.43	$33.54

[1] Does not include transfer of $1540.00 from Code 5442-001—"Personal Service Salaries" to Code 5443-007—"Personal Services—Wages."

III. Summary of Total Maintenance Budget for the Fiscal Year 1943–1944

	Personal Service	*Other than Personal Service*
Income		
Tax Budget	$ 89,021.00	$ 6,568.97
Private Funds	71,812.06	36,066.86
Expenditure		
Tax Budget	89,020.90	6,535.53
Private Funds	55,503.84	17,056.41
Total Income	160,833.06	42,635.83
Total Expenditure	144,524.74	23,591.94
Balance	$ 16,308.32	$19,043.89

Balance of $33.54 remaining from City Appropriations as of June 30, 1944, reverted to City of New York "General Accrual Fund."

Respectfully submitted,
Edna A. Palmitier,
Acting Secretary

Note: The above "Financial Statement" is a transcript of Brooklyn Botanic Garden Accounts in the books of the Treasurer of the Brooklyn Institute of Arts and Sciences. The Treasurer's accounts are audited annually by a Public Accountant, and a separate audit of this "Financial Statement" is not made in order to save unnecessary expense.

Edwin P. Maynard,
Treasurer

From the report of Alfred Gundersen, Curator of Plants. About 40 new species or varieties of plants were added to the outdoor collection. Among these were *Decumaria barbara, Danae racemosa,* and varieties of *Ilex crenata* and *Buddleia.* About 200 shrub labels were put out.

Victory gardening continues to attract considerable public interest, and Mr. Free states that the Demonstration Victory Gardens at the south end of the Esplanade were maintained as during the previous year. Eighteen thousand square feet of ground were made available for vegetable culture in the Experimental Field. These were divided into 20 plots 20 × 30 ft. and 15 plots 20 × 20 ft. which were tilled by 35 employees of the garden on their own time.

The Children's Gardens, although not Victory Gardens in the special way we now understand the term, were productive and gave gardening training to about 200 eight to fourteen year olds.

Miss Shaw reports that the plants for the Children's Gardens, as well as for many home Victory Gardens, were raised in connection with Saturday morning classes and adult classes. Thirty thousand plants were produced in these efforts.

Conservatories. *From the report of Dr. Gundersen.* During the winter a number of plants in the conservatories were identified and labeled and a new map was made of the plants in the large house. Small plants of the bread-fruit tree, durian, chaulmoogra tree and jute were added to our collections. The Araceae in the conservatories have been revised.

From the report of Mr. Free. Reorganization of conservatories started in 1943, and was continued during the first three months of 1944 by removal of the boulder "bridge" in the Economic House; also by building a stone wall and constructing planting space around the pool. Brick edging was constructed along the walks. House No. 1 was changed to include the Evolution exhibit, and its center bench was removed to accommodate tubbed plants used on occasion for decorating in the Laboratory Building. In House No. 2 the center bench was removed and the ground bed made to accommodate "planted out" aroids. The east bench was changed to more suitably display the Bromeliad collection on logs and tree stumps.

Financial. The list of gifts of funds, etc., supplements that which appeared in the RECORD, Vol. XXXIII, No. 1. Expenditures and income for the fiscal year 1943–44 may be found on pages 198 to 201.[1] See Appendix 1 for donors, etc.

Research and Related Activities of Curators and Resident Investigators.

EXCERPTS FROM REPORTS

RESEARCH ON DISEASE RESISTANCE IN CHESTNUTS (*from the Report of Arthur Harmount Graves*): About 150 of the 1943 pollinations produced good live seeds, and hybrid seedlings. Some of those from crosses of our best Japanese-American with native American stock, look very promising.

On the three principal plantations—on land belonging to the White Memorial Foundation at Litchfield, Conn., on land of Mr.

[1] The irregular arrangement of the financial reports is due to the necessity of saving paper.

Archer Huntington at Redding Ridge, Conn., and on our Hamden plantation—there are in all about 1000 hybrids. At least a dozen of these have so far resisted inoculation tests with the blight fungus and seem, therefore, to be highly resistant; but only a few of them have the desired erect habit needed for a timber tree. These 12 trees are mainly crosses of Japanese-American stock with the Chinese chestnut and back crosses of Japanese-American with resistant Japanese stock. We continue to enjoy the cooperation of the Division of Forest Pathology of the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture.

Research on disease resistance in oats (*from the Report of George M. Reed, Curator of Plant Pathology*): A new race of loose smut of oats has been discovered this season. This race has the capacity of infecting the oats variety Victoria, which has proved highly resistant to most known races of loose and covered smut, and has been used extensively in hybridization for the improvement of oats. Some promising selections from oats crosses involving the variety Victoria, have proved to be resistant, and in these cases the other parental variety originally used in crossing was resistant to this new race.

Research in plant classification (*from the Report of Henry K. Svenson*): During the spring of 1944 a monographic account was completed of the species of water fern (*Azolla*) in North and South America. The first part of this paper, illustrated by three plates of photographs and line drawings, is in press (see "publications"). *Azolla* may be seen in the pool which terminates the Botanic Garden brook in late summer. These small aquatic ferns are so numerous as to completely cover the surface of the water, and for this reason have been important as a means of mosquito extermination. Five species are represented in North and South America, especially in the tropics.

Research on ferns (*Ralph C. Benedict, Resident Investigator*): For Dr. Benedict's research and related activities, see the thirty-third Annual Report issued in January 1944.

Research on drug plants (*Ralph H. Cheney, Resident Investigator*): During the first six months of 1944, a survey was begun to determine the availability of drug plants in the nurseries

of Rhode Island, Vermont, New Hampshire, and Maine. This investigation will complete the original problem of obtaining such information regarding the northeastern United States. A report on New Jersey, New York, Connecticut and Massachusetts was published in April 1944.

APPENDIX I

GIFTS RECEIVED JULY 1, 1943–JUNE 30, 1944

Collections Fund *

Battle Pass Chapter—D.A.R	Miss Mary S. Pullman
Otto Ebel	Bernard H. Smith
Mrs. William Emerson	Woman of '76 Chapter N.S.D.A.R.
Mrs. R. M. Gunnison	Frank Uthoff
Mrs. John E. Leech	Anonymous
Mrs. Whitney Merrill	Anonymous

Total amount contributed ..... $ 109.00

C. Stuart Gager Memorial Fund

416 contributors $8,869.50
(Complete list of names and amounts will be listed in the 1944–1945 Annual Report)

Plant Pathology Research Fund

Anonymous	$1,500.00	
Anonymous	2,500.00	
Coker's Pedigreed Seed Co.	100.00	$4,100.00

Ellen Eddy Shaw Endowment Fund

Dr. I. O. Becher	$ 5.00
Mrs. Herman Blatt	5.00
Class B8—1944	10.00
Mrs. Muriel A. Davey	5.00
Miss Anna Marie Gissel	20.00
George H. Greenwood	5.00

* *Note:* Contributions to the Brooklyn Botanic Garden constitute proper deductions under the Federal Income Tax Law.

Miss Sadie Hecht—2 series F Bonds ($25.00 face value)	37.50	
Mrs. Anna Hoffer	1.00	
Mrs. Nathan Klee	25.00	
Mrs. R. H. Lees	2.50	
P.S. 208—Brooklyn	10.00	
Melvin Smalley	5.00	
John F. Struse, Jr.	10.00	$ 140.50

Special Award

Horticultural Society of New York	$ 5.00

Special Gifts for Children's Work

Mrs. Charles Perkins	$ 25.00

Special Needs of the Garden

Anonymous	$ 500.00

Special Purposes Designated by Donors

Mrs. Charles A. Boehrer in memory of Charles A. Boehrer	$ 100.00	
Goodman Family	50.00	
Anonymous	500.00	$ 650.00

GIFTS RECEIVED JANUARY 1–JUNE 30, 1944

Library

A total of 14 books, 275 pamphlets and 406 parts of publications in addition to 1 portrait and 15 miscellaneous items were received as gifts. A list of donors follows.

Prof. Delia Abbiatti
Agricultural Research Institute (Sudan)
Dr. H. H. Allan
American Spice Trade Association
Prof. Irving W. Bailey
Dr. Carleton R. Ball
Dr. R. H. Barnes
Mr. F. C. Bawden
Beechnut Packing Company
Lt. (j.g.) W. S. Benninghoff
Dr. George O. Burr
Prof. Harold Saxton Burr
California Academy of Sciences
Mr. Arturo Castiglioni
Dr. Ralph Holt Cheney
Mr. George L. Clarke
Dr. F. E. Clements
Dr. T. D. A. Cockerell
Dr. W. R. I. Cook

Corn Industries Research Foundation
Mr. Edward R. Dewey
Mr. Richard Dittman
Mr. Carl J. Drake
Mr. Everett E. Edwards
Dr. Orie Jacob Eigsti
Mr. N. R. Ellis
Mr. R. A. Fisher
Florida University. Library
Prof. W. P. Fraser
l'Abbe Alexandre Gagnon
Dr. T. H. Goodspeed
Mr. Richard H. Goodwin
Dr. Alfred Gundersen
Dr. S. C. Harland
Dr. Francis Harper
Dr. Constance E. Hartt
H. J. Heinz Company
Dr. L. R. Hesler
Mr. C. W. Hock
Hoffmann-LaRoche, Inc.
Dr. C. C. Hosseus
Imperial Chemical Industries
Dr. C. T. Ingold
Institute of Agriculture (Anand)
Instituto Botanico de Universidad Central (Ecuador)
Inter-American Institute of Agricultural Sciences
Dr. W. O. James
Mr. Charles F. Jenkins
Dr. O. E. Jennings
Mr. Deane B. Judd
Mr. B. Kassanis
Dr. Bostwick H. Ketchum
Dr. Robert W. Lamson
Hermano León
Mr. Burton E. Livingston
Dr. George L. McNew
Prof. Rogers McVaugh
Maine University. Library
Prof. L. A. Maynard
Metropolitan Museum of Art
Middle American Research Institute
Mr. Reid Moran
Mutual Orange Distributors
Dr. S. R. Narayana Rao
National Audubon Society
New York State College of Forestry
Miss Blanch Pennington
Dr. Henri Pittier
Dr. J. H. Priestley
Mr. Kenneth B. Raper
Resinous Products and Chemical Company
Prof. A. J. Riker
Dr. William J. Robbins
Dr. J. M. Roque
Santa Barbara Botanic Garden
Dr. George Sarton
Dr. R. E. Schultes
Dr. Paul B. Sears
Miss Ellen Eddy Shaw
Dr. Kenneth M. Smith
Smithsonian Institution
Sociedad Mexicana "Amigos de las Orquideas"
Spencer Lens Company
E. R. Squibb & Sons
Prof. C. N. Stark
Dr. Morris Steggerda
Dr. F. J. Stevenson
Dr. Lewis H. Tiffany
Toronto University. Department of Botany
Dr. E. N. Transeau
Mr. Otto Treitel
United Fruit Company, Middle America Information Bureau
Prof. C. B. Van Niel
Dr. S. A. Waksman
Mr. David Wasserman
Dr. Paul Weatherwax
Dr. J. E. Weaver
Dr. E. T. Wherry
Mr. Alfred F. Whiting
Dr. L. R. Wilson
Wine Institute
Prof. C.-E. A. Winslow
Winthrop Chemical Company, Inc.
Wisconsin State Historical Society

Department of Plants

Living Plants

Bixby, Mr. C., Brooklyn, N. Y. 9 Dentaria diphylla.
Doney, Mr. C. F., Brooklyn, N. Y. 1 Sophora flavescens.
Flowerfield Bulb Farm, Flowerfield, L. I. 420 Cannas.
Jackson & Perkins Co., Newark, N. Y. 32 Roses, 10 Viola.
Libby, Mrs. F., Hollis, L. I. 1 Jasminum grandiflorum.
Mee, Mr. J., Brooklyn, N. Y. 3 Pyxidanthera barbulata, 3 Epigaea repens.
Parrella, Mr. A., N. Y., N. Y. 55 Dahlia tubers.
Slama, Mrs. M. Brooklyn, N. Y. 1 Ceratonia Siliqua.
Tricker, Wm., Inc., Saddle River, N. J. 69 Hardy Waterlilies in variety. 44 Tropical Waterlilies.
Wolfsohn, Sgt. C., Ft. Myers, Fla. 2 Cyrtopodium punctatum, 1 Encyclia tampense, 2 Epidendrum.
Wollny, Mr. W., Brooklyn, N. Y. 2 Nerine flexuosa.

Seed Packets

Bernhardt, Capt. A. A., N. Y., N.Y. (21)
Birch, Mr. E. O., Short Hills, N. J. (1)
Kittridge, Miss E. M., Vergennes, Vt. (2)
Simmonds, Mr. D., Ithaca, N. Y.
Lily Committee, American Horticultural Society (6)

Phanerogamic Herbarium

Cornman, Mrs. M. Alice, 25 miscellaneous specimens collected in Florida.
Kittredge, Miss E. M., 23 miscellaneous specimens collected in Vermont.
Runyon, Hon. Robert, 8 Eleocharis specimens collected in Texas.

Cryptogamic Herbarium

Kittredge, Miss E. M., 47 miscellaneous specimens of Lichens and 6 miscellaneous specimens of Mosses.

For the Department of Elementary Instruction

Dittman, Richard, One book for the Children's Clubroom Library.
Harmon Foundation, One Kodachrome motion picture reel on Victory Gardening.
Levine, Walter, Thirty-five photographs of tropical and semi-tropical fruits and blossoms for the Clubroom.
Perkins, Mrs. Charles E., $25.00 honorarium for work in the Children's Garden.
White, Miss Harriet H., Cotton bolls for use in classwork.

Note: Gifts of money from various sources have been added to the Funds of the Department and are included in the financial report.

APPENDIX 2

PUBLICATIONS BY THE BOTANIC GARDEN PERSONNEL JANUARY 1–JUNE 30, 1944

Cheney, R. H.

Variation in reproductive phenomena by caffeine. (Abstract.) *Proceedings Federation of Amer. Soc. for Exper. Biology,* vol. 3, no. 1, March, 1944.

Drug plant production in New York and adjacent states. *Medical Record* **157**: 218–220. April, 1944.

Dorward, Margaret M.

The children's greenhouse. *Educational series, Dept. of Elementary Instruction.* May.

Free, Montague.

Report of the Horticulturist for 1943. *Brooklyn Bot. Gard. Record* **33**: 24–25. January.

Grafting and making cuttings. Abstract of lecture. *Horticultural Society of New York. Monthly Bulletin* **15**: 21–23. February.

Four gardening articles in *The Home Garden* and 14 in the *New York Sun.*

Graves, Arthur Harmount.

Children at work. *Brooklyn Inst. Bull.* **47**[4]: 32. January.

Botany. Revision service (for 1943). *Collier's National Encyclopedia.* New York. April.

Chestnut breeding work in 1943. *Brooklyn Bot. Gard. Record* **33**: 11–13. January.

Report of the Curator of Public Instruction for 1943. *Brooklyn Bot. Gard. Record* **33**: 15–19. January.

The retirement of Austin Foster Hawes, State Forester of Connecticut. *Hartford Courant,* Hartford, Conn. January.

What is Botany? *Brooklyn Inst. Bull.* **47**[5]: 32. February.

Victory Garden Courses. *Brooklyn Inst. Bull.* **47**[6]: 32. March.

Spring at the Garden. *Brooklyn Inst. Bull.* **47**[7]: 32. April.

46 articles on events at the Brooklyn Botanic Garden, for metropolitan newspapers.

6 abstracts for *Biological Abstracts*.

Graves, Arthur H. and George M. Reed.

C. Stuart Gager. *Torrey Bot. Club Bull.* **71**: 193–198. May.

Gundersen, Alfred.

Flower Structure and the Classification of Dicotyledons. *Brooklyn Bot. Gard. Record* **33**: 14. Jan.

Report of the Curator of Plants for the Year 1943. *Brooklyn Bot. Gard. Record* **33**: 21–22. Jan.

Large Trees in Prospect Park. *Brooklyn Eagle*. April.

More Trees in Prospect Park. *Brooklyn Eagle*. June 20.

Review of *Lilacs for America* by John C. Wister. *The Monthly Bulletin of the Horticultural Society of New York* **15**: 22. March–April, 1944.

Jordan, William E.

Report on the Library for 1943. *Brooklyn Bot. Gard. Record* **33**: 26–27. January.

Variety in garden books makes library opportunity. [Editorial.] *Library Journal* **69**: 249. March 15.

Reed, George M.

Thirty-third annual report of the Brooklyn Botanic Garden: Report of the acting director. *Brooklyn Bot. Gard. Record* **33**: 1–9. January.

Plant Pathology. *Brooklyn Bot. Gard. Record* **33**: 9–11.

Reed, George M. and Arthur H. Graves.

C. Stuart Gager. *Torrey Bot. Club Bull.* **71**: 193–198. May.

Shaw, Ellen Eddy.

Annual report of the Curator of Elementary Instruction. *Brooklyn Bot. Gard. Record* **33**: 19–21. January.

Boys, girls and vegetables. *Forecast* **LX**: 24–27. March.

Svenson, Henry K.

Report of the Curator of the Herbarium for 1943. *Brooklyn Bot. Gard. Record* **33**: 23–24. January.

C. Stuart Gager. *Ecology* **25**: 1–2. January.

Review of "Shrubs of Michigan" by Cecil Billington. *Am. Fern Journ.* **34**: 63–64. April–June.

The New World Species of Azolla. *Am. Fern Journ.* **34**: 69–84 (in press).

APPENDIX 3

TALKS, LECTURES, ADDRESSES, AND PAPERS GIVEN BY THE BOTANIC GARDEN PERSONNEL, JANUARY 1–JUNE 30, 1944

By Elizabeth Clarke:

Jan. 17. *House Plants.* Bay Ridge Garden Club.

Jan. 18. *House Plants.* Garden Group of Manhasset Woman's Club.

March 9. *Small Flower and Vegetable Garden.* Rockville Center Garden Club.

March 21. *From Seed to Harvest.* South Strathmore Garden Club.

April 7. *Victory Garden Forum.* Abraham & Straus Dept. Store.

April 11. *Flowers for Spring.* Castle Manor Garden Club.

April 25. *Summer Care of the Garden.* Namm's Dept. Store.

By Charles F. Doney:

April 3. *Fertilizers.* Brooklyn Heights Garden Club.

June 27. *Insect Pests of Woody Plants.* Strathmore Garden Club, Manhasset, L. I.

By Margaret M. Dorward:

6 talks on *Victory Gardens* before various organizations, at schools, and CDVO meetings.

By Montague Free:

January 19. *Grafting and how to make cuttings.* Horticultural Society of New York.

February 16. *Plant propagation.* Torrey Botanical Club meeting. At the Garden.

March 17. *Improving the soil in the victory garden.* Mass meeting of Teachers and Superintendents. At the Junior H. S. for the Deaf.

March 20. *Plant culture.* Federated Garden Clubs of New York. Hotel Roosevelt.

March 22. *Herbaceous borders.* New York Times and Federated Garden Clubs of New Jersey and New York. At Times Hall. (Sponsored by the Times—proceeds for the benefit of the Red Cross.)

March 28. *Victory gardens.* Kiwanis Club of Brooklyn.

April 10 and 11. *Demonstration planting of Victory Garden.* At the Garden.

April 11. *Seed sowing and planting.* Victory Garden Program at Namm's Store. Demonstration and lecture.

May 10. *Plants and People.* Advisory Council, Salvation Army. At the Garden.

May 18. *Victory Garden headaches.* C.D.V.O. Pershing Square.

June 21. *Flowers for your vegetable garden.* Garden Club of Darien.

June 26. *Plant clinic.* C.D.V.O. Pershing Square.

By Arthur Harmount Graves:

February 23. *The work of the Brooklyn Botanic Garden.* Triboro Hospital.

March 31. *Geology with special reference to the Brooklyn Botanic Garden.* Science Club of Erasmus High School. At the Garden.

April 7. *The work of the Brooklyn Botanic Garden.* Westwood Garden Club.

April 28. *Plants for plastics.* Stuyvesant High School Farm Club.

May 3. *Food plants of the world.* P.S. 23, Bronx.

May 10. *Trees and Arbor Day.* Brooklyn High School for Homemaking.

May 17. *The work of the Brooklyn Botanic Garden.* The Suwasset Garden Club of Port Jefferson, N. Y. At the Garden.

May 18. *The American chestnut tree.* Mrs. Gladys Gordon Fry's Bird and Tree Group. Montclair, N. J.

May 19. *Grafting.* Science Club of Erasmus High School.

June 14. *The Brooklyn Botanic Garden.* The Staten Island Garden Club. At the Garden.

By Alfred Gundersen:

May 8. *Lilacs.* New Canaan Garden Club.

By Elsie Hammond:

June 7. *Plants that have gone to war.* Lutheran Church of the Good Shepherd, Bellaire, N. Y.

By Frances M. Miner:

January 14. *The Children's Garden at the Brooklyn Botanic Garden.* National Victory Garden Institute, Savoy Plaza Hotel.

By George M. Reed:

March 31. *Cereals.* Biology Class, Stuyvesant High School. At the Garden.

By Hester M. Rusk:

April 4. *Edible wild plants.* Garden Club of the Oranges.

May 17. *Conservation of Wild Flowers.* Brooklyin High School for Homemaking.

By Ellen Eddy Shaw:

5 talks on *Victory Gardens.*

3 talks on *Children's Gardens.*

4 talks on *The Brooklyn Botanic Garden.*

6 speeches for special occasions.

By Alys Sutcliffe:

March 21. *Insect pests and diseases of the Victory Garden.* Abraham & Straus Garden Center.

By Henry K. Svenson:

January 11. *Birds of Ecuador.* Bird Club of Brooklyn.

February 16. *The Brooklyn Botanic Garden in kodachrome.* Torrey Botanical Club. At the Garden.

April 26. *South American markets.* Class in Home Economics, Pratt Institute.

May 10. *Ecuador and Peru (kodachromes).* Garden Club of Triboro Hospital.

May 16. *Northern New England (kodachromes).* Winter's Night Club. At the Garden.

By L. Gordon Utter:

10 talks on *The Victory Garden Program* before various organizations.

APPENDIX 4

RADIO TALKS GIVEN JANUARY 1–JUNE 30, 1944

From Station WNYC:

January	7.	Native American Vegetables.	Miss Clarke
January	21.	Plants Serving Soldiers at War.	Dr. Cheney
February	4.	New Uses for Herbs.	Miss Van Brunt
February	18.	Brighten Your Garden with Shrubs.	Mr. Doney
February	21.	"Victory Gardening" on Mrs. Bussing's Program "War-Time Living."	Dr. Utter
March	3.	Victory Gardening: Getting Ready.	Mr. Free
March	17.	Flower Garden Mustards.	Miss Clarke
March	31.	Children's Victory Gardens.	Miss Miner
April	14.	*Leaflets three, let it be.*	Miss Rusk
April	28.	The Flowers that Bloom in the Spring.	Miss Shaw
May	12.	Plants for Plastics.	Dr. Graves
May	18.	Victory Gardens. (Victory garden questions in connection with C. D. V. O. Pershing Square.)	Mr. Free
May	26.	Summer Plans for the Victory Garden.	Dr. Utter
June	9.	Rare Trees in the Brooklyn Botanic Garden.	Dr. Gundersen
June	21.	Victory Gardens.	Miss Dorward

From Station WAFM:

February	15.	"Victory Gardening" on Mrs. Bussing's Program "War-Time Living."	Dr. Utter

From Station W75NY:

April	4.	Victory Gardens.	Mr. Free

APPENDIX 5

STATISTICS RELATING TO LIVING PLANTS

JANUARY–JUNE, 1944

	Species or Varieties	*Plants*
Living Plants Received:		
By collection	4	293
By exchange	18	27
By gift	132	655
By purchase	78	696
Total	232	1,671

SEED EXCHANGE

Seed Packets Received:	
By collection	
By exchange	65
By gift	30
By purchase	245
Total	340
Seed Packets Distributed:	
To members	
By exchange	15
By gift	14
Total	29
Plants and Cuttings Distributed:	
To members	
By exchange	27
By gift	178
Total	205

APPENDIX 6

HERBARIUM ACCESSIONS AND DISTRIBUTION

Phanerogamic Herbarium

Accessions:

By Gift:

	Sheets	
Cornman, Mrs. M. Alice, Washington, D. C.	25	
Kittredge, Miss E. M., Rutland, Vt.	23	
Runyon, Hon. Robert, Brownsville, Texas	8	56

By Exchange:

Bazuin, Mr. C. W., Grand Rapids, Mich.	77	
Gray Herbarium, Cambridge, Mass.	58	
León, Brother Hermano, Havana, Cuba	1	
Lepage, Rev. E., Rimouski, Quebec, Canada	17	
O'Neill, Rev. H., The Catholic University of America, Washington, D. C.	2	
Rosengurtt, Dr. B., Estacion Juan Jackson, Uruguay	103	
U. S. Forest Service, Washington, D. C.	2	
U. S. National Herbarium, Washington, D. C.	25	
Warner, Dr. S. R., Sam Houston State Teachers College, Huntsville, Texas	69	354

By Collection:

Graves, Dr. A. H., Brooklyn Botanic Garden	11	11
		421

Distribution:

By Exchange:

O'Neill, Rev. H., The Catholic University of America, Washington, D. C	16	
Rosengurtt, Dr. B., Estacion Juan Jackson, Uruguay	50	66
		66

Cryptogamic Herbarium

Accessions:

By Gift:

Kittredge, Miss E. M., Rutland, Vt.	53	53

By Exchange:

McFarland, Dr. Frank T., University of Kentucky, Lexington, Ky. ..... 51 fungi

HERBARIUM MATERIAL LOANED

	Sheets
Shaver, Dr. J. M., George Peabody College for Teachers, Nashville, Tenn.	13
	13

HERBARIUM MATERIAL BORROWED FOR STUDY

Chicago Natural History Museum, Chicago, Ill.	3
Gray Herbarium, Cambridge, Mass.	136
Johnson, Mr. H. L., South Meriden, Conn.	24
Kern, Dr. F. D., Pennsylvania State College, State College, Pa.	1
Mould, Mr. H. J., Brooklyn, N. Y.	2
Murphy, Dr. R. C., American Museum of Natural History, New York, N. Y.	17
New York Botanical Garden, Bronx Park, New York, N. Y.	31
Simmons, Mr. G. W., Bronx, N. Y.	3
U. S. Forest Service, Washington, D. C.	2
U. S. National Herbarium, Washington, D. C.	110
	329

APPENDIX 7

STATISTICAL REPORT ON THE LIBRARY ACCESSIONS

	Autograph Letters	*Portraits*	*Volumes*	*Pamphlets*	*Parts (Including Periodicals)*
Exchange	2	0	19	56	1,534
Gift	0	1	14	275	406
Publication	0	0	0	6	29
Purchase	0	0	36	3	418
Total	2	1	69	340	2,387

Books, pamphlets, and serials catalogued	857
Total number of cards typewritten and filed	1,024
Torrey Botanical Club index cards filed	889
making a total of 64746	
Number of users of the Library	1,371

Books lent to members of the staff	854
Reference questions	204

American Fern Society Collection

Total number of volumes in American Fern Society Collection, June 30, 1944	62
Total number of pamphlets	327
Number of parts added	1

APPENDIX 8

REPORT OF PHOTOGRAPHIC WORK

Negatives on file December 31, 1943		10,800
Negatives accessioned Jan. 1–June 30, 1944		100
Total negatives on file June 30, 1944		10,900
Lantern slides on file Dec. 31, 1943		7,225
Lantern slides accessioned Jan. 1–June 30, 1944		65
Total lantern slides on file June 30, 1944		7,290
Prints on file Dec. 31, 1943		10,800
Prints made Jan. 1–June 30, 1944	624	
Prints used or distributed	524	
Prints filed Jan. 1–June 30, 1944		100
Total prints on file, June 30, 1944		10,900
Enlargements made Jan. 1–June 30, 1944		52
Kodachromes made Jan. 1–June 30, 1944		400

APPENDIX 9

SIGNS AND LABELS

Signs and labels were made by Mr. John McCallum as follows:

Small galvanized labels for herbaceous beds and for Rose Garden	154
Large galvanized labels for herbaceous beds	27
Lead labels for woody plants	66
Tree labels (lead)	47
Wood labels for Roses, Iris, etc.	164
Wooden signs	11
Cardboard signs	59
Wooden hanging labels for trees and shrubs	137
Total	665

Also numerous miscellaneous numbers and signs.

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Contributing Members		34
Sustaining Members		
Through the Botanic Garden	23	
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Annual Members		317
Total, as of December 31, 1944		816

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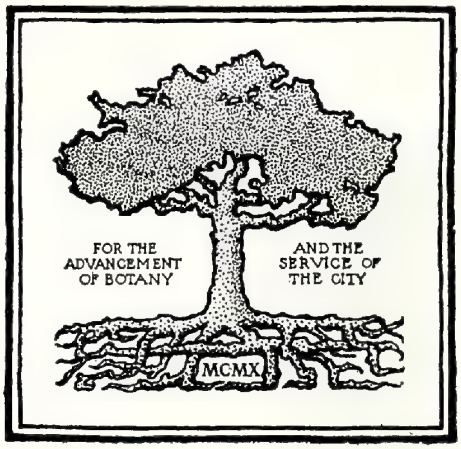

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MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn 25, N. Y.* Telephone, Main 2–4433.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

TO ASSIST MEMBERS and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden.* Arrangements must be made by application to the Curator of Public Instruction at least one week in advance. No parties of less than ten adults will be conducted.

TO REACH THE GARDEN take B.M.T. Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. BY AUTOMOBILE from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Papers:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk. By Norman Taylor. 1923. 108 pages. $1.00.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 96. Inheritance of smut resistance in hybrids of Navarro oats. By George M. Reed. 7 pages. 1942.

No. 97. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1941. By Arthur Harmount Graves. 5 pages. 1942.

No. 98. Flower forms and groups of Dicotyledones. By Alfred Gundersen. 7 pages. 1943.

No. 99. Phytopathology 1867–1942. By George M. Reed. 15 pages. 1943.

No. 100. I. *The new world species of Azolla.* 18 pages. II. *A new Isoetes from Ecuador.* 5 pages. By Henry K. Svenson. 1944.

No. 101. Interdependence in plant and animal evolution. By Alfred Gundersen and George T. Hastings. 10 pages. 1944.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illlustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail, 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, by mail, 30 cents.

Guide No. 14. The local flora section (native wild flower garden) of the Brooklyn Botanic Garden. 27 pages; 18 illustrations. By Henry K. Svenson. Price, by mail, 30 cents.

Guide No. 15. The Herb Garden of the Brooklyn Botanic Garden. 42 pages; 2 illustrations and map. By Elizabeth Remsen Van Brunt and Virginia Riddle Svenson. Price, by mail, 30 cents.

Guide No. 16. The Medicinal Plant Garden of the Brooklyn Botanic Garden. 45 pages; 12 illustrations. By Arthur H. Graves, Charles W. Ballard, Ralph H. Cheney, and F. J. Pokorny. Price, by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.